PART III

Staff Reports

1. Finance and Investment

CAPITAL FORMATION AND FINANCING IN THE UNITED STATES

The 1956 Annual Report listed the papers already published on this study of long-term trends and future prospects in capital formation and financing, initiated in 1950 with the aid of a grant from the Life Insurance Association of America. During 1956 one monograph was published:

Capital Formation in Residential Real Estate: Trends and Prospects, by Leo Grebler, David M. Blank, and Louis Winnick

Two other monographs have gone to press:

Capital in Agriculture: Its Formation and Financing since 1870, by Alvin S. Tostlebe

Financial Intermediaries in the American Economy since 1900, by Raymond W. Goldsmith

Still another monograph is being readied for review by the Directors:

"Capital in Transportation, Communication, and Public Utilities: Its Formation and Financing," by Melville J. Ulmer

The following monographs are reported on below:

"Capital in Manufacturing and Mining: Its Formation and Financing," by Daniel Creamer, Israel Borenstein, and Sergei P. Dobrovolsky

"Trends in Government Financing," by Morris Copeland

The first four chapters of the summary volume on long-term trends in capital formation and financing, outlined in last year's report, have been written. For the analysis in these and subsequent chapters, the basic estimates of population, labor force, national product, and components, were extended through 1955. I hope that the remaining chapters (5 through 12) will be completed by the end of 1957.

SIMON KUZNETS

Mining and Manufacturing

In Part I of this monograph Israel Borenstein and I analyze the trend in the growth of the stock of capital, beginning with 1870 for mining and 1880 for manufacturing. For bench-

mark years, the stock of capital is related to output, and trends in this relationship are investigated. Occasional Papers 41 and 45 gave preliminary reports of the results. The reports are now combined into a single manuscript, the analysis is extended from 1948 to 1953, and the underlying data and estimating procedures are presented in an appendix. In Part II, Sergei P. Dobrovolsky analyzes trends in financing. His findings were outlined in the 1954 Annual Report. We hope the monograph will be ready to submit to the Directors during the summer of 1957. I summarize here only the results of extending the analysis to 1953.

Between the postwar business cycle peak of 1948 and the succeeding peak of 1953, net fixed capital in manufacturing increased 26 per cent and total capital, 28 per cent – substantial growth rates. (These and subsequent calculations are in terms of 1929 prices.) For these benchmark years the ratios to output of fixed and working capital could be computed for nineteen industry groups.

The total capital-output ratio for all manufacturing increased by 1.8 per cent between 1948 and 1953; a rise occurred in nine of the nineteen groups. The 1953 ratio for all manufacturing, however, was 17.8 per cent below that of 1937. In only two groups (beverages and motor vehicles) did the total capital-output ratio exceed the 1937 ratios.

The movements of the two major components of total capital – fixed and working capital – were divergent. For all manufacturing the fixed capital-output ratios in 1948 and 1953 were virtually identical, but the comparable ratio for working capital increased by 3 per cent. Two-thirds of the major industry groups, using over half of all fixed capital devoted to manufacturing in 1953, continued to operate with fixed capital of increasing efficiency, that is, the fixed capital-output ratio continued to decline. This decline, which began in the post-World War I period, has apparently not yet spent itself in the post-World War II period, at least it had not through 1953.

The rise between 1948 and 1953 in the ratio of working capital to output for all manufacturing was true also for eleven of the nineteen industry groups. This suggests that the decline of the working capital-output ratio from 1919 to 1948 has been interrupted.

For mining, as a whole, the decline in the capital-output ratio continued to 1953. The ratio in the latter year was 6 per cent below the ratio for 1948. If "capital" is restricted to plant (structures and equipment), the decline is even larger, nearly 9 per cent. On the other hand, the ratio of working capital to output was unchanged in 1948 and 1953. However, the continued decline of the ratio for all mining appears to be due to developments in the petroleum and natural gas industry, which in 1953 used 68 per cent of all capital devoted to mining. In the other four major mining groups all ratios (total capital, plant, and working capital, to output) were higher in 1953 than in 1948. The conclusion seems inescapable that the decline in the ratio of capital to output in mining industries, which had been operative for three decades, was reversed in the five-year period 1948-1953, except in the petroleum and natural gas industry.

DANIEL CREAMER

Trends in Government Financing

A draft of this monograph was completed during the year and submitted to a staff review committee. Six chapters had been drafted earlier. The main points in Chapter 7, concerning, especially, wartime deficit financing and debt retirement, follow.

The percentage of deficit financing during World War I was only a little lower than that for the Union during the Civil War. Improved budgetary procedures and a fuller understanding of fiscal impacts helped to make possible a substantially lower percentage during World War II. However, procedural considerations alone would probably be sufficient to prevent a complete pay-as-you-go policy, were we to face another financing problem comparable to that of World War II.

After both the War of 1812 and the Civil War debt retirement was in large measure a by-product of protectionism. After World

War I partial debt retirement was mainly a result of the slowness with which wartime taxes were reduced. After World War II there was no comparable possibility of inadvertent debt retirement and, on net balance, insufficient pressure for deliberate debt retirement.

MORRIS A. COPELAND

POSTWAR CAPITAL MARKETS

This project began in the summer of 1955 under a grant of the Life Insurance Association of America. It includes three monographs dealing with the main sectors of the capital market – government securities, business securities and loans, and mortgages. (Progress on these is reported below by their authors.) The study also includes a set of basic statistical estimates of saving, investment, national wealth, and national assets on an annual basis, 1945-1955, and of quarterly flows of funds through the capital markets, 1953-1955. My report describes the annual data; the quarterly data are discussed in a later section.

The estimates of national wealth, revising and extending those published in *A Study of Saving in the United States,* have been completed. They show, as Table 1 indicates, a rapid increase in national wealth since 1945, averaging 3.3 per cent a year after the elimination of price changes. Changes in the structure of wealth also appear, notably sharp increases in the shares of producer and consumer durables and declines in the shares of land (continuing a long-term trend), monetary gold, and livestock.

The annual estimates for saving and investment and those for national balance sheets as of the end of 1945, 1949, 1952, and 1955 are expected to be completed in the summer. I hope that the results, like those on national wealth, can be made available as Occasional Papers before the end of the year.

A preliminary somewhat condensed version

TABLE 1

PRELIMINARY ESTIMATES OF THE NATIONAL WEALTH OF 1945-1955

	1945	*1949*	*1952*	*1955*
	Total National Wealth[a] *(billions of dollars)*			
Current values	565[b]	907[b]	1,171	1,344
1946-1947 prices	785	893	996	1,090
	Percentage Distribution of Current Value Totals			
Reproducible tangible assets:				
Nonfarm residences	24.9	23.3	23.5	23.9
Other private structures	15.4	15.7	15.5	16.1
Government structures	8.1	8.3	8.3	9.4
Producer durables	8.5	10.8	11.5	11.9
Consumer durables	8.2	9.9	10.5	10.7
Livestock	1.7	1.4	1.3	.8
Inventories	7.5	7.4	7.9	7.5
Monetary metals	4.2	3.1	2.3	1.9
Total	78.5	79.9	80.8	82.2
Nonreproducible assets:				
Agricultural land	7.7	5.6	5.7	5.1
Other	14.2	13.0	12.2	11.6
Total	21.9	18.6	17.9	16.7
Net foreign assets	—0.4	1.5	1.3	1.1
Total	100.0	100.0	100.0	100.0

[a] Not including military assets.

[b] Figures in *A Study of Saving* (Vol. III, p. 14) of $571 billion (1945) and $898 billion (1949) should be increased for subsoil assets ($6 billion in 1945, $12 billion in 1949) for comparability.

of the national balance sheet for the end of 1955, using short cut methods for some items, is shown in Table 2. The final version will be more detailed, separating, for example, personal trust funds and nonprofit organizations from households; financial from other corporations; preferred from common stocks; farm from urban mortgages. The final version will also show separately foreigners' shares in the claims and liabilities of the different types.

The figures of Table 2 are therefore bound to deviate somewhat from the final estimates. But the order of magnitude of the figures and their interrelations – and these are the things that matter for economic analysis – are not likely to be affected. Within these limitations, and with a few conceptual differences, usually minor, the figures may also be compared with the national balance sheets for 1949 and earlier benchmark dates published in *A Study of Saving* (Volume III, Tables W-9 to W-16).

A comparison of the national balance sheet of 1955 with that for 1945, the beginning of the postwar decade, shows the following main changes (apart from the changes in the structure of tangible assets already mentioned):

1. The total current value of national assets (the combination of the aggregate assets of all economic units in the United States) has doubled, rising from approximately $1,550 billion to almost $3,100 billion. Only part of this increase is explained by the roughly 50 per cent rise in the general price level.

2. The increase was much more pronounced for tangible assets (approximately 130 per cent) than for intangibles (about 80 per cent). As a result the financial interrelations ratio declined from almost 1¾ to not much over 1¼, mostly between 1945 and 1949, when the repressed inflation of the war years led to a sharp increase in the prices of tangible assets.

3. The share of corporate stocks in intangible assets increased from 15 to almost 25 per cent as the absolute value of stock outstanding almost tripled, wiping out the large difference between market value and adjusted book value (taking plant and equipment at replacement rather than original cost) existing at the end of the war.

4. Among claims (nearly four-fifths of all intangible assets in 1945 but less than three-fourths in 1955), federal securities lost sharply in importance. Their share fell from 35 per cent to not much over 20 per cent. Deposits (particularly currency and demand deposits) also lost substantially. The most pronounced gains were made by mortgages, receivables, pension reserves, and state, local, and corporate bonds. The share of life insurance in total claims remained virtually unchanged.

5. Notwithstanding the absolute increase in debt of more than 60 per cent, the debt to total assets ratio declined. As a result, the share of equity in total assets rose from 50 to 60 per cent. For all sectors other than the federal government – which did not participate in this expansion of debt – liabilities were equal to approximately one-third of assets both at the beginning and at the end of the decade. Federal debt lost in importance compared to national wealth, national assets, and national income.

6. Consumers slightly increased their share in total national assets, and nonfinancial corporations raised theirs considerably, between 1945 and 1955. On the other hand, agriculture, financial institutions, and the federal government lost in importance (measured by their shares in total national assets), while unincorporated business and state and local governments just held their own.

Instead of the fourth monograph originally contemplated, I hope that a short essay can be prepared before the project will have to end – probably in the fall of 1957 (because of the exhaustion of funds). This essay might set forth the main changes we have found in the financial structure of the United States during the postwar decade, and, possibly more important, the areas in which further statistical research and analysis of material already at hand is required; and point to the questions of theory and policy that remain to be answered.

Participants in the project include Jack

TABLE 2

PRELIMINARY NATIONAL BALANCE SHEET, 1955

(current value; billions of dollars)

	Nation 1	*Consumers*[a] 2	*Farm Business* 3	*Nonfarm Noncorporate Business*[b] 4	*Financial Intermediaries*[c] 5	*Other Corporate Business* 6	*Federal Government*[d] 7	*State and Local Governments* 8
Tangible Assets[e]:								
Residential structures	343	280	17	15	1	25	1	4
Nonresidential structures	321	20	16	20	3	140	31	91
Land[f]	225	59	69	11	1	48	11	26
Producer durables	160	1	18	22	1	114	1	4
Consumer durables	144	144	—	—	—	—	—	—
Inventories	111	—	17	17	0	69	7	0
Monetary metals	26	1	0	0	0	0	24	0
Total	1,329	506	137	86	5	396	75	124
Intangible Assets:								
Currency and deposits in other financial institutions	311	158	7	18	76	32	8	13
Life insurance reserves[g]	80	80	—	—	—	—	—	—
Pension and retirement funds, private (noninsured)	15	15	—	—	—	—	—	—
Pension and retirement funds, government[h]	58	58	—	—	—	—	—	—
Receivables from business	123	1	0	8	45	59	10	—
Receivables from households[i]	53	—	—	8	25	19	—	—
Mortgages	130	21	—	1	103	2	4	—
Securities, federal	272	61	—	7	168	22	—	14
Securities, state and local	46	19	—	..	25	1	1	—
Securities, corporate bonds	69	16	—	..	54	..	—	—
Securities, corporate stock	405	321	—	1	28	56	—	—
Equity in col 4[j]	83	83	—	—	—	—	—	—
Miscellaneous assets	69	4	3	..	17	12	33[k]	..
Total	1,713	836	10	42	540	203	56	27
Valuation difference[l]	32	—	—	—	—	32	—	—
Total assets	3,074	1,342	147	127	545	631	130	151
Liabilities:								
Currency and deposits	331	—	—	—	304	—	27	—
Life insurance reserves	82	—	—	—	82	—	—	—
Pension and retirement funds[c]	73	—	—	—	73	—	—	—
Payables to banks	56	15	5	11	0	25	—	—
Other payables to business	87	29	2	2	2	49	2	—
Mortgages	130	82	9	23	—	17	—	—
Bonds and notes	397	—	—	—	2	70	279	46
Miscellaneous liabilities[m]	110	3	..	8	34	65[k]	1	..
Total	1,265	128	16	44	498	226	309	46
Equities:								
Unadjusted	1,777	1,214	132	83	48	373	—179	106
Valuation difference[l]	32	—	—	—	—	32	—	—
Total	1,809	1,214	132	83	48	405	—179	106
Total liabilities and equities	3,074	1,342	147	127	545	631	130	151

Figures will not always add to totals because of rounding.

— means not applicable.

0 means less than $0.5 billion.

.. means not estimated, but presumed to be small.

[a] Includes households (farm and nonfarm), nonprofit organizations, and personal trust funds.

[b] Includes all multi-family and commercial real estate owned by individuals.

[c] Includes federal unemployment trust fund and federal life insurance funds as well as pension and retirement funds (private and governmental).

[d] Consolidated basis. Includes federal corporations and Treasury monetary funds. Military assets excluded.

[e] Excluding military assets.

[f] Includes subsoil assets and forests.

[g] Net of policy loans.

[h] Includes federal unemployment trust fund and federal life insurance funds as well as government pension and retirement funds.

[i] Includes loans on securities.

[j] Equity in farm business has been excluded to preserve comparability with the balance sheets in *A Study of Saving* (Volume III), where farm households were included in the farm sector.

[k] Includes accrued corporate income taxes ($18 billion).

[l] Valuation difference on "securities, corporate stock," i.e. market value ("securities, corporate stock," col. 1) less book value ("equities, unadjusted," col. 6).

[m] Includes borrowing on securities and accrued items.

Farkas (until June 1956), George Horwich (until September 1956), Saul B. Klaman, David Meiselman, Morris Mendelson, Roland I. Robinson, and Eli Shapiro.

RAYMOND W. GOLDSMITH

Government Securities Markets

The basic survey of the market for state and local government securities ended early in 1956, and the materials and findings were brought together in a manuscript which was completed about midyear. A revised draft is now being circulated for review, suggestions, and criticism. The chapter headings are:

Chapter

Summary of Findings

1 Introduction
2 The Demand for Funds
3 The Supply of Funds
4 The Marketing of New Issues
5 The Secondary Market
6 The Pricing of Tax-Exempt Securities
7 The Market for Obligations Based on Revenues

There will also be a statistical appendix and an expository appendix.

The sharpest increase in yields on state and local government obligations came in the fall of 1956; a development that caused considerable political discussion. Less noticed, but of considerable interest to monetary theorists, was the fact that the contour of the yield curve for state and local obligations, which started the decade parallel to that for United States Treasury securities, had grown away from this position in recent years. In 1956 it departed even further from that for federal government obligations.

This experience confirms the principal conclusion reached in this study: that the market for the privilege of tax exemption is itself becoming increasingly narrow. If state and local governments are to continue capital expenditures at the rates indicated by road and school building plans, the funds probably can be raised only if most of the benefit of tax exemption is passed along to investors and relatively little is retained in the form of lower borrowing costs. A paper on "Factors Accounting for the Sharply Increased Cost of State and Local Government Borrowing" was presented at the December 1956 meetings of the American Finance Association in Cleveland.

Sample tabulations of the shifts in ownership of newly sold and allotted United States Treasury securities were started late in 1956. The tabulations showed that the marketing of these offerings required a considerable amount of reshuffling of ownership during the early months after each offering. They also suggest that commercial banks have played the principal role in the marketing of Treasury offerings. The marketing function of nonbank dealers, while important, was shown to be secondary to that of banks, even for new long-term issues.

The yield curve for United States Treasury obligations assumed an odd humpbacked character in the second half of 1956. This development apparently was due to commercial banks' domination of the market for intermediate term obligations. Further analysis of this unprecedented development will be attempted.

ROLAND I. ROBINSON

The Market for Corporate Securities and Loans

Present plans call for completion of the monograph "Corporate Securities and Loan Market" by the end of the summer. The proposed table of contents is as follows:

Chapter

1 The Financial Structure of Business Corporations at the End of 1945 and 1955
2 Sources and Uses of Corporate Funds; Annually, 1945-1955; and Quarterly, 1953-1955
3 The Flow of Funds from the Capital Market
4 The Institutional Framework of the New Issue Market
5 The Sale-Leaseback – A New Development in Postwar Corporate Finance
6 The Relationship of Bank Lending to Other Sources of Funds
7 The Secondary Market for Outstanding Stocks and Bonds
8 Interest Rate Movements and Fund Flows
9 Summary and Conclusions

The first three chapters will be submitted for review in the early summer and the next three chapters should be completed by the end of the summer. It is anticipated that each group of three chapters will appear as a separate Occasional Paper later in the year. We are still gathering data for Chapters 5 through 8.

A progress report on the study was read at the meetings of the American Finance Association in Cleveland, December 1956.

ELI SHAPIRO

The Postwar Mortgage Market

A part of the study of mortgage markets was submitted to a staff reading committee in March for review as an Occasional Paper, tentatively entitled "The Postwar Rise of Mortgage Companies." A summary analysis of the paper was presented at the meetings of the American Finance Association held in Cleveland in December 1956. A proposed Technical Paper on the development and appraisal of statistics on the "Net Flow of Mortgage Funds" is also being readied for review. A third part of the study dealing with the institutional framework of the postwar mortgage market, expected to be submitted for review in May, may also be published separately.

It is anticipated that a draft of the full monograph will be completed by late spring or early summer. Proposed chapters to be included are as follows:

Chapter

1 Introduction and Summary
2 An Overview of Mortgage Market Changes in the Post-World War II Decade
3 Elements in the Changing Postwar Mortgage Market
4 The Structure of Mortgage Interest Rates
5 Mortgage Policies and Practices of Major Financial Institutions
6 Market Techniques and Characteristics
7 The Postwar Rise of Mortgage Companies

Appendixes

1 Net Flows of Mortgage Funds
2 Gross Flows of Mortgage Funds
3 Survey of Mortgage Companies

Remaining to be drafted are the chapter on mortgage interest rates and the appendix on gross mortgage flows. All the other chapters have been drafted and are being revised in light of comments made by the director of the study. The new data on interest rates and gross mortgage flows include a series on conventional mortgage interest rates from selected life insurance companies, and data on gross mortgage lending and repayments (including a breakdown between contractual and other repayments) from life insurance companies,

TABLE 3
COMBINED BALANCE SHEET OF MORTGAGE COMPANIES
(*millions of dollars*)

	1945	*1950*	*1954*	*1955*
Assets:				
Total assets	160	731	1,202	1,822
Cash (incl. escrows)	30	83	170	225
Mortgage loans	71	536	845	1,372
Other current assets	32	51	72	94
Noncurrent assets	27	61	116	131
Liabilities and net worth:				
Total liabilities and net worth	160	731	1,202	1,822
Escrows	17	51	109	143
Notes payable to banks	58	405	712	1,171
Undisbursed mortgages	5	67	61	116
Other liabilities	28	81	111	150
Net worth	52	128	209	243

Source: Based on summary records of the Federal Housing Administration.

mutual savings banks, and savings and loan associations.

The proposed Occasional Paper on mortgage companies is based largely on new data developed in the study. In addition to annual and quarterly financial data on mortgage companies, the report includes information on the nature and types of their mortgage activities, their geographic distribution, and their relationship to institutional investors. The extraordinarily rapid growth of mortgage companies in the postwar decade and their dependence on bank financing to carry mortgage inventory is clearly indicated in Table 3.

The proposed Technical Paper on net mortgage flows includes more comprehensive statistics than are now available on amounts of mortgages by type of property and type of lender for 1945 through 1956, annually through 1952 and quarterly thereafter. A detailed description of sources and methods of estimation is provided in an introductory analysis and in notes to each table.

The possible Occasional Paper on the institutional framework of the market would encompass essentially Chapters 5 and 6 listed above. These chapters are based in large part on interviews with executives of leading financial institutions and include analyses of mortgage lending policies and practices, techniques of mortgage market operation, relationship between primary and secondary mortgage markets, and the market for junior mortgage financing.

SAUL B. KLAMAN

The Quarterly Flow of Funds

Estimates of the flow of funds through the capital market for the years 1953 through 1955 are completed. They are based on the Federal Reserve Board's flow of funds accounts but differ chiefly in being on a quarterly rather than an annual basis. We also added a sector made up of mortgage company, finance company, and trust subsectors; otherwise the major sectors in the two sets of accounts are approximately the same.

Our classification of transactions differs from the Board's in two respects. We consolidated into a single net flow all the non-capital-account, nonfinancial flows which the Board shows in great detail. On the other hand, we show the financial flows in greater detail than it does; for example, corporate securities are given by type and by industry. Thus, while both sets of accounts measure the amount of funds demanded on capital account, the Board's set presents greater detail on the supply of inside funds; ours, on the supply of outside funds.

A cursory analysis of these accounts was undertaken and incorporated in the progress report presented at the meetings of the American Finance Association in Cleveland, December 1956.

MORRIS MENDELSON

CAPITAL FINANCING: SOURCES OF FUNDS

I am currently preparing a manuscript on the results of my study of capital financing in the petroleum and steel industries. Through a study of two relatively homogeneous groups of companies – twenty-four petroleum and seventeen steel companies, from 1921 through 1953 – I hope to find out why capital financing patterns vary. I was concerned primarily with differences in the relative importance of "internal" and "external" sources of capital and with the composition of external capital in terms of the different classes of securities. During the year data have been secured from the Board of Governors of the Federal Reserve System on some of the variables which permit the extension of the analysis to an additional group of 168 companies in nine major industries, from 1946 through 1955.

Another part of the study on capital financing concerns the relationship of depreciation charges and capital replacement requirements, the latter defined as the amount of capital needed to maintain physical output. For example, after allowing for price changes, were capital consumption charges since 1929, measured on the basis of depreciation charges, excessive in relation to replacement requirements? A test was developed which used cross-section data on capital-output ratios for

seventeen industries in the 1930-1948 period.

By this test, depreciation charges when adjusted for price level changes do appear to have been excessive. For theoretical reasons, incremental capital-output ratios should be independent of capital expenditure rates if depreciation charges roughly equal replacement requirements. A positive relationship between the two suggests that depreciation charges exceed replacement requirements; a negative relationship, that the requirements exceed the charges. For each of the seventeen industries, I computed the ratio of the incremental capital-output ratios for two periods, 1930-1948 and 1938-1948. For the same industries I computed the ratios of the capital expenditure rates in the two periods, defining capital expenditure rate as the ratio of increment in capital during the period to the initial capital stock. The relationship between the two variables was distinctly positive. The Pearsonian coefficient of correlation was 0.91 and was found to be statistically significant at the 0.01 level.

MICHAEL GORT

CORPORATE BOND RESEARCH

The work of the corporate bond research project, which is being completed with the aid of a grant from the Merrill Foundation for the Advancement of Financial Knowledge, has proceeded according to schedule and should be finished by mid-year. The major findings of the investigation are to be embodied in a series of three reports.

The first, *The Volume of Corporate Bond Financing since 1900,* was published in 1953. The second, *Corporate Bond Quality and Investor Experience,* is in press and is expected to appear in late 1957 or early 1958. It will contain major analytical findings of the investigation bearing upon practical investment operations and the economic consequences of risk bearing.

During the past year the work of the project staff was distributed about equally between final revision of the second report and the preparation and checking of tables to be included in the third report, "Statistical Measures of Corporate Bond Characteristics and Experience." The latter will consist largely of basic statistical tabulations supplementing and supporting the second volume. It will also provide notes on coverage, derivation procedures, suggested uses of the materials, and cross-references to related tabular materials in the three volumes of the series.

An abridged version of the third report should be ready for the Directors in a few months, containing the complete table of contents and explanatory notes, and a set of illustrative tables. In all, 233 statistical tables will be included in the final document, covering important characteristics of corporate bond offerings, extinguishments, defaults, and outstandings, 1900-1943, and selected measures of investor experience over various assumed natural and chronological investment periods. It will in effect constitute a detailed set of mortality and experience tables for corporate bonds covering nearly a half-century of United States financial experience.

W. BRADDOCK HICKMAN

BASIC YIELDS ON CORPORATE BONDS

Since the publication of Technical Paper 6 in 1947, I have kept the corporate bond basic yield series more or less up to date by furnishing data on request for publication in the *Economic Almanac,* the *Statistical Abstract,* and *Historical Statistics.* In the fall of 1955 I began to explore the possibilities of further research on basic yields. To date, this project has succeeded in bringing the regular first-quarter basic yield series up to date with the percentages given at the top of the facing page. The 1957 figures are clearly suspect, since they lie far below the market for new issues. During early 1957, high grade corporate bonds were being floated at yields around 4.25 per cent.

I have also compiled the data necessary to construct a quarterly basic yield series for the years 1952-1955. Three small tasks remain: (1) to construct quarterly basic yield curves from the data already compiled; (2) to write a concluding report; and (3) to suggest that if

Years to Maturity	First Quarter 1955	First Quarter 1956	First Quarter 1957[b]
1	a	2.70	3.50
2	a	2.72	3.50
3	a	2.74	3.50
4	a	2.76	3.50
5	2.70	2.78	3.50
6	2.72	2.80	3.50
7	2.74	2.81	3.50
8	2.76	2.83	3.50
9	2.78	2.85	3.50
10	2.80	2.86	3.50
12	2.83	2.89	3.50
15	2.88	2.93	3.50
20	2.95	2.99	3.50
25	3.00	3.04	3.60
30	3.04	3.09	3.68
35	3.07	3.14	3.74
40	3.10	3.17	3.78

[a] Reliable estimates for these values were considered impossible.

[b] More than usually liable to error.

the corporate basic yield series is still considered important, some attempt be made to find permanent sponsorship, since I do not intend to continue the series.

DAVID DURAND

TRENDS AND CYCLES IN THE MONEY SUPPLY

A draft of the monograph by Anna Schwartz and myself on the stock of money is nearly complete and should go to the staff reading committee shortly. The monograph analyzes the secular and cyclical behavior of the money supply since 1875, describes the methods of estimation, and presents detailed data on components of the money supply.

Perhaps the most interesting finding of the secular analysis is that long swings in the supply of money parallel the long swings in other economic activities studied earlier by Arthur Burns and Simon Kuznets and currently by Moses Abramovitz. The long swings in the stock of money seem episodic rather than recurrent, and autonomous rather than a reflection of the long swings in general economic activity.

The long swings in the stock of money per unit of output are reflected faithfully in prices. In consequence, the real stock of money per unit of output is much stabler than the nominal stock. It has shown a fairly steady upward trend, apparently produced by changes in real income. A 1 per cent increase in real income per capita produces an increase between 1 and three-quarters and 2 per cent in the real stock of money per capita and hence between three-quarters and 1 per cent in the real stock of money per unit of output. The changes in real income seem to dominate the changes in the real stock of money.

The cyclical analysis reveals a close and highly consistent relation between the stock of money and cyclical changes. Because of its upward trend, the stock of money rises during most cyclical contractions but typically at a slower rate than during cyclical expansions. The effects of cyclical forces are therefore most clearly marked in the rate of change of the money supply rather than in its level. This is entirely reasonable; the rate of change of the money supply is a flow and thus conceptually comparable with the flows of goods and services comprising national income; the money supply itself is a stock at a point in time and thus conceptually comparable with other stocks like national wealth or the stock of houses.

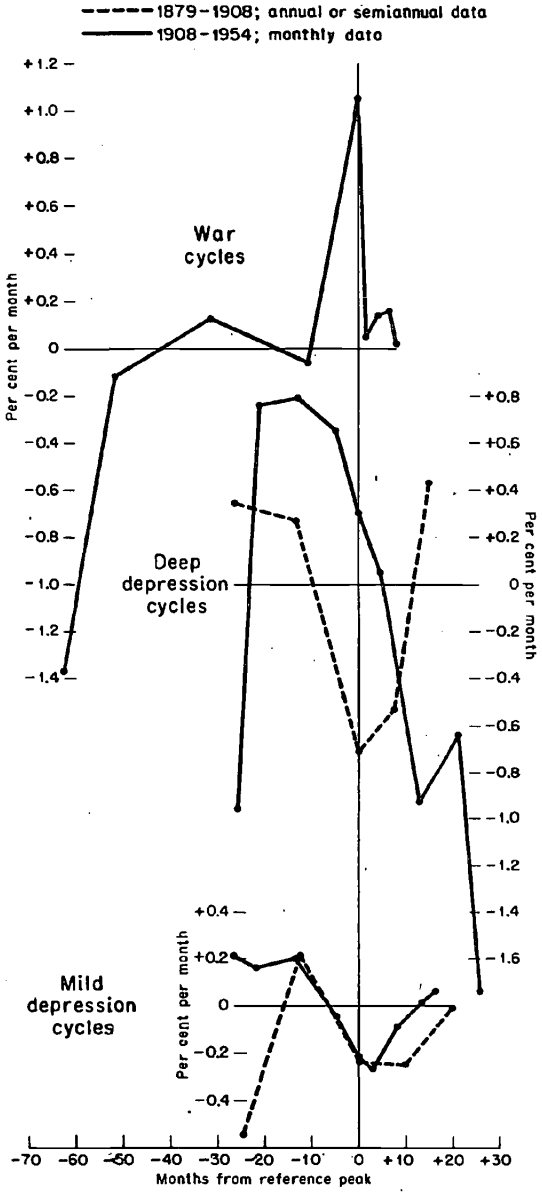
Chart 1 delineates the average reference cycle patterns of the rate of change of the money supply for different groups of cycles and different periods. These patterns show a sharply marked cyclical movement, characterized by long leads at both peaks and troughs, when the series is analyzed on a positive basis. War cycles aside, the one exception is the decline between the final two stages for the later deep-depression cycles, and this exception is the product of a statistical discontinuity in our data for early 1933 arising from the bank holiday and cannot be attributed any economic significance.

Our dating of specific cycles in the rate of change series yielded a one-to-one correspondence of specific and reference cycles for the earlier segment. For the later segment we dated two extra specific cycles and skipped one

reference expansion – the post-World War II expansion from October 1945 to November 1948. The specific cycle turn leads the matched reference turn at every one of the 19 troughs and 18 peaks for which there are matching turns. The lead varies from 6 to 29 months at peaks, from 4 to 22 months at troughs, averages nearly 16 months at peaks and over 12 months at troughs, and shows no evidence of any secular change over the more than seventy-five years spanned by the data or of any difference for the several types of cycle. The leads are roughly 60 per cent of the length of the cycle phases within which they fall. In view of the length of the lead, an alternative interpretation of the series is that it conforms to the cycle invertedly with a lag rather than positively with a lead. However, several statistical tests give clear-cut evidence against this alternative interpretation.

CHART 1

Average Reference Cycle Patterns of the Rate of Change of the Money Stock for Different Groups of Cycles and Different Periods, 1879-1954



It is clear from the chart that the amplitude of the cyclical movement is decidedly larger for deep depression cycles than for mild depression cycles. This difference in average patterns led us to compare, cycle by cycle, the amplitude of expansions and contractions in both the stock of money and its rate of change with the amplitude of the corresponding movements in general business as recorded in two different indexes of general economic activity. The results are unambiguous. There is a close, though by no means perfect, relation between the two: the larger the monetary change, the larger tends to be the change in general business.

The remainder of the cyclical analysis deals with the relation between changes in money, in income, and in prices, and with the behavior of components of the money supply. Offhand, the cyclical behavior of velocity and of real cash balances seems in sharp contrast to their secular behavior. Strangely enough, the two can be reconciled by using some of the ideas and results incorporated in my *A Theory of the Consumption Function,* currently in press.

The regular and consistent cyclical behavior of the money supply is open to two very different interpretations: first, that monetary changes are a major autonomous factor producing cyclical fluctuations; or second, that the supply of money is responsive to other factors producing cyclical fluctuations or to the fluctuations themselves. The greater consistency of the behavior of the money series when it is regarded as conforming positively than when it is regarded as conforming in-

vertedly, together with the long lead shown by changes in money when it is so regarded, is persuasive but not conclusive evidence for the first interpretation; most of our other results are consistent with either interpretation. Phillip Cagan's study of the factors determining the supply of money promises to furnish additional evidence on the relative validity of the two interpretations.

Cagan's preliminary results indicate that the growth in "highpowered" money – currency and the Federal Reserve balances of banks – accounts for most of the long-run increase in the money supply. For much of the period since 1875, a fairly steady decline in the currency-deposit ratio worked in the same direction but for part of the period it rose and thereby offset the effect of increases in highpowered money. The reserve ratio of the banking system fell over most of the period up to 1929, and so contributed to an increase in the money supply, but has since risen markedly and is now at about the same level as in the 1880's, so that it has had little net effect over the period as a whole.

The reserve ratio and the stock of highpowered money have also played an important role in cyclical changes in the money supply. The currency-deposit ratio has generally played a secondary role in cyclical variations, except occasionally during banking panics.

We are currently analyzing the factors that underlie each of these determinants. For example, gold flows had a decided influence on highpowered money during the last half of the nineteenth century; they had little effect after 1934. The currency-deposit ratio is affected by the cost of holding currency relative to deposits and by the relative usefulness of the two forms of money. The reserve ratio is determined by the structure of the banking system, legal reserve requirements, and the relation among interest rates on different kinds of claims. As these examples show, the particular threefold classification of determinants of the money supply adopted has the virtue of segregating out three largely independent sets of forces involving primarily different factors.

MILTON FRIEDMAN

THE QUALITY OF CREDIT IN BOOMS AND DEPRESSIONS

The need to develop new sources of information on current changes in lending policies and in the quality of credit was indicated in exploratory studies financed by a grant from the Association of Reserve City Bankers.[1] In July 1956, under a grant from the Merrill Foundation for the Advancement of Financial Knowledge, work began on a three-year study directed toward meeting this need. Among those engaged on the study are George Brinegar, Donald Jacobs, Edward J. Kilberg, Philip Klein, and Victor Zarnowitz.

The construction, to the extent possible, of a system of current reporting on the quality of credit will be our primary objective. In the course of the study we hope to:

Clarify the meaning of "credit quality"

Devise and test different ways of measuring it

Organize and analyze the data available in existing records

Develop suggestions for the collection of new data

Extract the economic implications from the data viewed in the light of past experience and present conditions

Since no single organization can collect and publish all the relevant current statistical series, in considering the actual, continuing collection of new types of data we will try to frame practicable suggestions that other agencies may be prompted to adopt. The formulation of such proposals will require careful thought, consultation with persons experienced in the field, and perhaps small-scale pilot studies. Naturally we hope that as suggestions emerge, they can be put into effect, so that our investigation can profit from the results.[2]

Responsible suggestions on the kinds of information needed to assess current changes in

[1] See my paper, "The Quality of Credit in Booms and Depressions," *Journal of Finance*, May 1956, pp. 288-300.

[2] Some suggestions of this sort are contained in the paper, "Changes in the Quality of Consumer Instalment Credit," referred to below.

the quality of credit require the careful examination and analysis of developments in the past. Not only recent changes but also changes during the booms and depressions of the interwar period must be studied – always, of course, with an eye on alterations in the character of the financial organization since those days.

There are two reasons for covering depressions, such as the mild recessions of 1948-1949 and 1953-1954 and the far more serious experience of the thirties. Previous studies have shown that the consequences of credit deterioration during booms appear in subsequent depressions and contribute to their severity.. They have also shown that the quality of new credits improves during depressions. These findings have important implications.

The failure to recognize credit deterioration during a boom may cause a severe shock to business confidence when trouble develops, a sharp contraction in lenders' commitments, and perverse requirements for liquidity and asset revaluation by supervisory authorities. Moreover, actual losses, charge-offs, and write-downs then may not only greatly exaggerate the eventual losses but also exaggerate the risks attaching to new investment opportunities. These actual and potential developments need to be set forth and documented if the study's full contribution to the problem of economic instability is to be realized.

Such a study might be planned on a comprehensive scale to cover all important types of credit and types of lending agency. Although our explorations suggest a definite need for this broad view, present plans are limited to the following interrelated projects, largely in the field of business credit. We propose to analyze:

1. The credit ratings compiled by rating agencies, such as Dun and Bradstreet, Inc., to determine their behavior as indicators of the credit worthiness of individual firms and the feasibility of a summary compilation showing shifts in credit ratings of the business population.

2. The level and trends in the financial ratios of individual companies (as indicators of their credit worthiness) in relation to their changing use of credit during booms and depressions.

3. Examiners' appraisals of loans by commercial banks and other lending institutions: their relation to business conditions and consequences for cyclical stability.

4. Delinquency, loss, and recovery rates on commercial bank credit in relation to the volume and composition of loan portfolios, valuation reserves, and charge-off policies (a preliminary report appears below).

5. The credit files of a few banks, to determine whether useful periodic summaries reflecting the quality of commercial loans can be obtained from them on a systematic basis at reasonable cost.

6. The usefulness for measuring credit quality of the classifications of farms used by the federal land banks for appraisal purposes, the delinquency data on land bank and Land Bank Commissioner farm mortgages, and the quality grades for short-term loans used by the examiners of production credit associations (a preliminary report appears below).

7. Loan terms, borrower characteristics, and loan experience in the field of consumer instalment credit, to appraise their significance as measures of credit quality. (This study was partially completed in connection with the preparation of a paper for the conference on the problem of consumer credit controls, held in October at the request of the Federal Reserve Board, but further work is planned.[3])

GEOFFREY H. MOORE

Loss and Recovery Experience of Commercial Banks

A study was started in November 1956 of the loss or charge-off and recovery experience of commercial banks in relation to their portfolio holdings and earning rates. For part of

[3] See "Changes in the Quality of Consumer Instalment Credit," by Geoffrey H. Moore, Thomas R. Atkinson, and Philip A. Klein, in Volume I of *Consumer Instalment Credit: Conference on Regulation*, Board of Governors of the Federal Reserve System, March 1957.

the period covered the banks will be classified by region, size, and possibly by other cross-sections.

In addition to providing a basic cyclical record of commercial bank losses or charge-offs and recovery rates as a possible aid in appraising cyclical changes in risk exposure and experience, the following issues are to be explored:

1. The extent to which shifts in portfolio composition during prosperity and depression produce changes in risk exposure and the extent to which such changes are compensated by differences in earning rates.

2. The relationship, if any, between loss or charge-off experience of selected banks and their subsequent willingness to undertake risk as shown by their ratios of risk assets to total assets or to capital accounts at various rates of return.

3. For selected banks during the early and middle thirties, the importance of deposit drains on the one hand, and loss and charge-off experience on the other, in relation to subsequent holdings of loans, investments, and cash.

4. Possible parallels between loss experience for selected banks in the twenties and in the recent postwar period. (This may include an analysis of suspended banks in the earlier period and appraisal of the present role of the Federal Deposit Insurance Corporation in precluding runs on banks with weakened solvency.)

5. The extent to which rulings of the Internal Revenue Service since 1947 have resulted in larger total capital accounts and reserves against losses. (The rulings provide a standard procedure for establishing tax-exempt additions to valuation reserves against loans.)

A major objective of the study is to delineate the type of data collection necessary for the current analysis of risk exposure and loss experience in commercial bank lending and portfolio holdings. This will probably consist of suggested modifications in the form of data presently collected as well as recommendations for the collection of new data.

So far a systematic survey of published data on bank losses and recoveries for various groupings of banks has been made. Several fairly obvious limitations of these published data for historical and current analysis of risk exposure and loss experience are:

1. Loss data are generally not available in relation to the period when the relevant loans or investments were contracted.

2. Recovery data are not available in relation either to the period when the corresponding losses were taken or when the loans were made.

3. Since the timing of loss taking is affected by the particular charge-off policies of each bank, information about these policies is essential to a proper interpretation of the data.

4. Losses, recoveries, and earnings are available only for two broad categories: total loans and total investments. To evaluate changes in risk exposure and experience such data should be collected for several relevant subgroups of loans and investments.

5. Losses taken on defaulted securities are not separated from losses through sales of issues in good standing (mostly federal securities) in data obtained by the banking authorities. Thus it is virtually impossible to distinguish the portion of security losses which results from defaulting issues.

EDWARD J. KILBERG

Agricultural Credit Quality

Available evidence suggests that at the present time agricultural credit quality is high but that it may be declining. Preliminary studies on the relation between increases in farm land values and farm debt in recent years show that increases in both have been widespread and, in many states, substantial. But there is little evidence so far of an associated rise in debt and in values of the sort that took place during World War I and contributed to the debt distress of the twenties and thirties. Time series data for the country as a whole show

TABLE 4

PERCENTAGE CHANGES IN CASH RECEIPTS FROM FARMING, FARM LAND VALUES, AND FARM DEBT

	1914-20	*1914-55*	*1939-48*	*1939-55*	*1948-55*
Cash receipts from farming, preceding year	+133	+388	+267	+273	+2
Land values per acre, March 1	+69	+19	+102	+150	+24
Total debt, January 1	+89	+87	−10	+52	+68
Real estate debt, January 1	+79	+74	−25	+21	+62
Non-real-estate debt, January 1[a]	+116	+125	+99	+271	+86

[a] Debt held by commercial banks, production credit associations, and private lenders discounting with federal intermediate credit banks.

that the ratio of debt to income is low, but that land values and debt have been increasing while income has been declining. This trend clearly suggests the possibility of a deterioration in credit quality. Unless present trends are reversed they may generate higher delinquency, bankruptcy, and foreclosure rates in the future than currently prevail.

With the cooperation and assistance of the Farm Credit Administration, three tests of credit quality measures are being planned. The first test will analyze data on the origin and disposition of production credit association loans by grade of loan in each of several geographical areas. The second will utilize delinquency data on federal land bank and Land Bank Commissioner real estate mortgages. The third will relate loan experience to the quality-of-farm classifications of the federal land banks. These farm and loan classifications constitute a rather unique body of data bearing on credit quality, and an examination of their validity as indicators of risk exposure may not only be of aid in arriving at sound appraisals of agricultural credit quality but also suggest practices that may be useful in other fields of credit.

GEORGE BRINEGAR

EXPLORATORY SURVEY OF THE ECONOMIC ASPECTS OF PENSIONS

During the past year this survey, supported by a grant from the Life Insurance Association of America, was completed. The report, *Suggestions for Research in the Economics of Pensions,* was published in April. It draws on materials prepared in the course of the survey by Gladys Webbink, Marvin Bloom, and myself, on discussions with the Advisory Committee to the project, and on advice from interested students in governmental bureaus, universities, research institutions, and business organizations.

Interpreting the area of pensions broadly to include old age and survivors insurance, railroad retirement, assistance payments (for old age and to the blind and disabled), veterans' payments, public service employees' pension arrangements, and private plans, the report sets forth, in the light of work already done and available materials, research suggestions for consideration by scholars and organizations interested in the economic effects of pensions. The main headings under which we formulated our research suggestions are:

1. Present and future scope and characteristics of pension plans
2. Impact of present and future pension plans on savings and investment
3. Relation of present and future pensions to the level and distribution of national income and product
4. Pensions and stability
5. The tax treatment of pensions and the aged

The members of the Advisory Committee, all of whom gave freely of their time and experience in discussions and in making suggestions from which this set of research proposals developed, are: E. Gordon Keith, *Chairman,* Samuel N. Ain, Robert M. Ball, George B.

Buck, Jr., F. F. Fauri, Edmund Fitzgerald, George Garvy, Challis A. Hall, Jr., Reinhard A. Hohaus, Benjamin B. Kendrick, C. Arthur Kulp, John H. Miller, Roger F. Murray, Robert J. Myers, Vito Natrella, James J. O'Leary, Joseph A. Pechman, Ray M. Peterson, Lawrence H. Seltzer, Sumner Slichter, Seymour L. Wolfbein and Leo Wolman.

DANIEL M. HOLLAND

THE INDIVIDUAL INCOME TAX

We devoted much time during the year to the relations between total personal income and taxable income. A paper on personal exemptions is nearing completion, and C. Harry Kahn, whose report follows, completed a draft of a manuscript on personal deductions. During the year ahead we plan to complete several other parts of our income tax studies.

The federal individual income tax differs from all other taxes in the extent to which the law seeks to take account of variations in the personal situation of the taxpayers. For this purpose it employs a variety of devices – exclusions from taxable income, personal exemptions, personal deductions, tax credits, and graduated tax rates. By far the most important of these are the graduated rates, of which the personal exemptions may be usefully regarded as an integral part.

Traditionally, the personal exemptions have been viewed as aimed primarily at preserving from income tax some minimum amounts of income deemed necessary for subsistence or for a tolerable standard of living. On this ground, the present exemptions – $600 per capita – are often criticized as too low. In truth, they are less than the amounts paid by public agencies in many communities to indigent aged, blind, and other disabled or disadvantaged persons. Under the joint authorization of the federal Social Security Act and the Michigan Social Welfare Act, for example, such an individual in Michigan may receive assistance up to $80 a month, and a married couple, up to $130 a month. And despite a rise of 94 per cent in consumer prices, the dollar amounts of the personal exemptions are now lower than they were in 1939 by 40 per cent for a single person, 52 per cent for a married couple, and 27 per cent for a couple with two dependent children.

As absolute allowances for a satisfactory standard of living, the present exemptions may seem small. But they are highly potent (together with the deductions) in keeping the effective tax rates relatively low on most small and moderate incomes. They also provide the major element in the graduation of effective tax rates for more than three-quarters of all taxpayers and more than three-quarters of the total adjusted gross income on taxable returns and take account of the number of a taxpayer's dependents and of whether he is sixty-five or more or blind.

If we look behind the formal bracket rates of the personal income tax, which begin at 20 per cent of the first $2,000 of "taxable" income, and calculate the total tax liability as a percentage of adjusted gross income, we get the effective tax rates presented in Table 5 for selected incomes. They are substantial for single persons even at low income levels, but much less so for the same adjusted gross income level for married couples and taxpayers with dependents.

For a married couple with two dependent children and $3,000 of adjusted gross income, the total tax is only $65, or 2.2 per cent of the income, though it is 10.2 per cent for a couple without dependents, and 14.2 per cent for a single person. A couple with two dependent children is not subject to an effective tax rate as high as 10 per cent unless income reaches $6,000, and not to a tax as high as 20 per cent unless income approximates $19,000. If more generous personal exemptions could be provided only by substituting equal revenues from increased excise and similar taxes, the presumption is strong that the total taxes paid by those with small and moderate incomes would be increased, the distribution of the total tax burden made less progressive, and thus a part of the higher allowance for dependents would be converted into a net additional burden.

The present level of the personal exemptions

is sometimes criticized on the opposite ground – that it is too high because it removes from the "tax base" a substantial fraction of all personal income, thereby reducing the revenue-yielding power of the income tax and necessitating a higher scale of tax rates on the taxable portions of incomes. In 1952, besides the estimated $19 billion of personal exemptions of individuals whose exemptions and deductions completely freed them from income tax, the personal exemptions on taxable returns amounted to $65 billion, compared with $108 billion of income actually subject to tax after exemptions and deductions. An average of slightly more than one-third of the total adjusted gross income of taxable returns was nominally excluded from the tax base by the personal exemptions in the years 1946-1952.

However, most of this exclusion is only nominal. Examination of the Congressional committee hearings on income tax changes over a long period of years clearly shows that in considering any proposed rate schedule, Congress regularly pays close heed to the combined effects of the proposed bracket rates *and* the personal exemptions upon the total or effective tax rates on incomes *before* the exemptions. In consequence, Congress may be said to determine deliberately the effective tax rates on incomes before the exemptions.

The personal exemptions are therefore usefully regarded as an integral part of the rate schedule, fixing the increments of income to which a zero rate of tax is applied, and influencing Congress in its determination of the structure of bracket rates. The only income that they now truly exclude from tax is the amount received by those with incomes only equal to or below the personal exemptions and deductions, about 8 per cent of total adjusted gross income in 1954. (Statistical errors and underreporting are estimated to account for an additional 9 per cent of adjusted gross income.) For all other taxpayers the major consequences of the personal exemptions are to reduce the effective tax rates below the nominal ones, to introduce a lively progression of rates on small and moderate incomes, and to do both in such fashion as to take significant account of a taxpayer's dependents and whether or not he is over sixty-five or blind.

LAWRENCE H. SELTZER

TABLE 5

INCOME TAX LIABILITY AS A PERCENTAGE OF ADJUSTED GROSS INCOME, SELECTED INCOMES, 1956

Rates are calculated after allowance for the personal exemptions and the standard deduction and are rounded to the nearest one-tenth of 1 per cent.

Adjusted Gross Income	*Single Person*	*Married Couple*	*Couple with two dependent children*
$700	1.1	0	0
1,000	6.2	0	0
1,500	10.1	2.1	0
2,000	12.1	6.1	0
2,500	13.3	8.5	0
3,000	14.2	10.2	2.2
3,500	15.0	11.3	4.4
4,000	15.6	12.1	6.1
4,500	16.1	12.8	7.4
5,000	16.4	13.2	8.4
6,000	17.5	14.1	10.0
7,000	18.3	14.9	11.1
8,000	19.2	15.5	12.2
10,000	21.0	16.4	13.7
12,000	23.3	17.9	15.3
14,000	25.5	19.1	16.8
16,000	27.8	20.4	18.1
18,000	30.0	21.4	19.4
20,000	32.1	22.7	20.6
30,000	40.8	28.1	26.4
40,000	46.6	33.4	31.8
50,000	51.3	38.0	36.6
75,000	59.8	46.2	45.1
100,000	65.9	52.1	51.2
200,000	77.7	66.4	65.8
300,000	82.1	73.9	73.5
400,000	84.3	77.9	77.6
500,000	85.7	80.5	80.3

Personal Expense Deductions

My manuscript is now being revised, before its submission to the Directors, to take account of the suggestions received from the staff and to incorporate data that have recently become available. A general idea of what is covered can be obtained from the table of contents:

Chapter

Introduction and Summary

1 The Place of Personal Expense Deductions in the Income Tax
2 The Quantitative Significance of the Personal Deductions in the Context of the Tax Base and Exemptions
3 Personal Deductions Reported on Taxable Returns, 1918-1953
4 Philanthropic Contributions
5 Nonbusiness Tax Payments
6 Personal Interest Payments
7 Medical Expenses
8 The Standard Deduction
Appendixes

In addition to work summarized in the 1956 Annual Report, I have attempted to show how much of each kind of deductible expense has turned up on tax returns over a period of years. In Table 1 estimated total amounts for the four major deductible expenditures are shown alongside the amounts actually deducted on tax returns in 1950 and 1952. In 1952, out of an estimated possible total of $25.6 to $26.9 billion, for philanthropic giving, nonbusiness taxes and interest payments, and medical expenses, $10.6 billion, or roughly 40 per cent, was deducted. This ratio would, of course, have been much higher had it not been for the standard deduction allowance, which accounted for about one-half of total personal deductions of $27.4 billion in 1952.

TABLE 6

SELECTED PERSONAL EXPENSE DEDUCTIONS COMPARED TO ESTIMATED TOTAL EXPENDITURES, BY CATEGORY, 1950 AND 1952

(dollars in billions)

	1950	*1952*
Philanthropic contributions:		
Estimated total:		
Andrews	$3.7	$4.5
Based on Commerce data	2.7	3.2
Amount deducted	2.3	3.1
Deduction as % of total:		
Andrews	61.3	68.6
Based on Commerce data	82.8	97.0
Nonbusiness tax payments:		
Estimated total	$6.5	$8.4
Amount deducted	2.2	3.2
Deduction as % of total	34.3	37.9
Personal interest:		
Estimated total	$3.5	$4.6
Amount deducted	1.5	2.2
Deduction as % of total	43.2	48.7
Medical expenses:		
Estimated total	$8.2	$9.4
Amount deducted[a]	1.6	2.1
Estimated expenses of claimants[b]	2.5	3.6
Deduction as % of total	19.0	22.8
Claimants' expenses as % of total	30.8	38.6

[a] After exclusions.
[b] Estimated medical expenses of those claiming the deduction.
Source: *Amount deducted* — *Statistics of Income,* Treasury Department, *Part 1; philanthropic contributions* — F. Emerson Andrews, *Philanthropic Giving,* Russel Sage Foundation, New York, 1950 (recent year estimates obtained from the author directly); the estimate based on Commerce data is our forward projection of a 1929-1942 series (*Survey of Current Business,* June, 1944) based in part on unpublished data; *nonbusiness tax payments* — Estimated by us in large part on the basis of Census, Treasury, and Commerce Department data; *personal interest payments* — *Flow of Funds in the United States, 1939-1953,* Board of Governors of the Federal Reserve System, 1955; *medical expenses* — Social Security Administration, Dept. of Health Education, and Welfare.

The extent to which the four major deductible items were actually deducted, aside from the standard allowance, differed considerably. Only one-fifth of eligible medical expenses were deducted. For taxes paid, the ratio was somewhat over one-third, and for personal interest payments it was nearly one-half. But, if we can trust available estimates – which are admittedly crude – the ratio for philanthropic contributions is surprisingly high: about 69 per cent if we use one estimate and 97 per cent if we use another.

In the course of the coming year I shall be working on other aspects of the income tax project, including the treatment of entrepreneurial income (that is, unincorporated business, independent professional, and farmers' income) and rents and royalties; the rate structure of the federal income tax; and state income taxes.

C. HARRY KAHN

OTHER STUDIES

Seven reports were published during 1956 and early 1957:

Thomas R. Atkinson, *The Pattern of Financial Asset Ownership: Wisconsin Individuals, 1949*

W. L. Crum, *Fiscal-Year Reporting for Corporate Income Tax,* Technical Paper 11

Donald C. Horton, *Patterns of Farm Financial Structure: A Cross-Section View of Economic and Physical Determinants*

J. E. Morton, *Urban Mortgage Lending: Comparative Markets and Experience*

Lawrence H. Seltzer, *Interest as a Source of Personal Income and Tax Revenue,* Occasional Paper 51

Problems of Capital Formation: Concepts, Measurement, and Controlling Factors, Studies in Income and Wealth, Volume Nineteen

Problems in the International Comparison of Economic Accounts, Studies in Income and Wealth, Volume Twenty

Six reports are in press:

W. Braddock Hickman, *Corporate Bond Quality and Investor Experience*

Daniel M. Holland, *The Income-Tax Burden on Stockholders*

Raymond J. Saulnier, Neil H. Jacoby, and Harold G. Halcrow, *Federal Lending and Loan Insurance*

Alvin S. Tostlebe, *Capital in Agriculture: Its Formation and Financing since 1870*

A Critique of the United States Income and Product Accounts, Studies in Income and Wealth, Volume Twenty-two

David Durand, *Bank Stock Prices and the Bank Capital Problem,* Occasional Paper 54

"Fund Flow Analysis," by Wilson Payne, is being revised. "Economic Fluctuations and Urban Real Estate Finance," by Wolfgang Stolper, is being reviewed by the staff. Earl Rolph is preparing a manuscript that will sketch the history of the national debt of various countries.

A conference on the problem of consumer credit regulations is reported in Part Two. Moses Abramovitz reports in Section 3 on a study of economic growth that will deal primarily with capital formation and financing. Other studies of finance and investment are reported by George J. Stigler and by Ralph L. Nelson in Section 4.

2. *Business Cycles*

STATISTICAL INDICATORS

In Table 7 I bring up to date the figures given in the 1956 Annual Report (page 26). They showed that business cycle expansions tend to proceed at a rate directly related to the magnitude of the preceding contraction and to slow down after the first year or so.

The first section of the table gives the percentage changes per year in seven economic series during the first twenty-four months of six business cycle expansions, including the current expansion that began in August 1954. (In last year's report the percentages were totals for the whole period, not per year.) The expansions are arrayed from left to right according to the amplitude of the preceding contraction, the amplitudes being measured by the average percentage decline in three indexes of business activity. The 1954 contraction was next to the mildest in the list.

TABLE 7

OBSERVATIONS ON THE PACE OF BUSINESS CYCLE EXPANSIONS, 1927-1956

Annual Percentage Rate of Change during First Twenty-four Months of Expansion

	Nov. 1927 to Nov. 1929[a]	*Aug. 1954 to Aug. 1956*	*Oct. 1949 to Oct. 1951*	*July 1924 to July 1926*	*June 1938 to June 1940*	*Mar. 1933 to Mar. 1935*
1. Nonagricultural employment		+3.7	+5.4		+5.5	+9.9
2. Industrial production	+6.0	+7.7	+11.5	+12.2	+25.0	+25.0
3. Gross national product	+5.3	+7.6	+15.8	+7.4	+10.2	+13.8
4. Personal income	+4.6	+7.2	+14.2	+6.6	+7.3	+15.9
5. Retail sales	+1.4	+7.2	+8.5	+4.4	+12.6	+15.9
6. Wholesale prices	−1.3	+3.5	+7.3	+0.9	+0.5	+8.8
7. Industrial stock prices	+9.2	+23.8	+22.6	+29.4	−3.0	+33.5

Annual Percentage Rate of Change in Industrial Production during Successive Intervals of Business Cycle Expansions

Expansions, First Twenty-four Months	*First Six Months*	*Next Nine Months*	*Following Nine Months*	*Twenty-four Months*
Nov. 1927 - Nov. 1929	+8.0	+16.0	−5.3[a]	+6.0[a]
Aug. 1954 - Aug. 1956	+16.3	+10.8	−1.1	+7.7
Oct. 1949 - Oct. 1951	+20.8	+22.2	−5.5	+11.5
July 1924 - July 1926	+34.1	+3.3	+6.5	+12.2
June 1938 - June 1940	+45.5	+24.2	+12.1	+25.0
Mar. 1933 - Mar. 1935	+80.0	0.0	+13.3	+25.0

Annual Percentage Rate of Change during Successive Intervals of the 1954-1956 Expansion

	First Six Months Aug. 1954 to Feb. 1955	*Next Nine Months Feb. 1955 to Nov. 1955*	*Following Nine Months Nov. 1955 to Aug. 1956*	*Latest Twelve Months Nov. 1955 to Nov. 1956*
1. Nonagricultural employment	+3.1	+5.1	+2.2	+2.5
2. Industrial production	+16.3	+10.8	−1.1	+2.4
3. Gross national product	+10.0	+9.1	+4.4	+6.1
4. Personal income	+5.3	+9.2	+6.3	+6.7
5. Retail sales	+7.8	+9.8	+4.2	+4.2
6. Wholesale prices	+2.3	+4.3	+3.6	+4.2
7. Industrial stock prices	+36.7	+25.5	+13.5	+0.8

[a] Expansion ended in June 1929. Annual rates computed for the nineteen month interval, Nov. 1927-June 1929, are: Series 2, +17.4; 3, +7.4; 4, +7.6; 5, +4.3; 6, −1.2; 7, +50.9.

Note: Percentage rates of change are all computed on the base of the three-month average centered on the trough month of the business cycle, and are simple rates. All series except 6 and 7 are adjusted for seasonal variation. The columns in the first section are arrayed from left to right according to the amplitude of the preceding business cycle contraction; the amplitude (average per cent decline in three indexes of business activity) for the contraction ending in Nov. 1927 is −9; Aug. 1954, −14; Oct. 1949, −18; July 1924, −22; June 1938, −45; Mar. 1933, −75.

Series	Source
1	Bureau of Labor Statistics; data not available before 1929.
2	Board of Governors of the Federal Reserve System.
3 & 4	Unpublished estimates by Harold Barger and Lawrence Klein through 1940; Department of Commerce estimates thereafter.
5	Department store sales before 1938, Board of Governors of the Federal Reserve System; sales of all retail stores from 1939, Department of Commerce.
6	Bureau of Labor Statistics; excluding farm products and foods.
7	Dow-Jones Co., Inc.

One of the simple yet important lessons of the table is that the rate of growth in economic activity during a recovery from a recession, whether mild or severe, is much larger than the *average* rate of growth over a long period. The smallest rate of advance in gross national product during the two-year intervals covered by the table is 5.3 per cent per year, two are better than 7 per cent, and three exceed 10 per cent. Yet the average rate of growth in GNP over a long period has been about 3 or 4 per cent per year.

Similarly, the long-run average rate of growth in industrial production has been about 4 per cent per year, but the recovery rates shown in the table range from 6 to 25 per cent per year. In forecasting rates of recovery from a recession (such as that of 1953-1954) one can anticipate better than average rates of growth. In such circumstances the frequently used long-run average is a highly conservative figure.

The rate of recovery clearly depends on the severity of the preceding contraction. The increases in employment, production, income, sales, and prices through August 1956 were generally larger than in the comparable period following the mildest contraction (1926-1927) but generally smaller than in periods following the more severe contractions. Of course, special factors – the advent of the Korean War in 1950, the start of World War II in 1939, the NRA episode in 1933-1934 – have affected the course of each recovery. Yet despite each expansion's unique factors, the table demonstrates that business cycle contractions exercise a considerable sway over the pace of subsequent recoveries, at least in their initial stages. A severe contraction brings with it a much lower rate of utilization of plant capacity and labor force than a moderate contraction, so recovery can and does proceed more rapidly.

The use of the trough month as the base of the percentages in the table may raise the question whether the rates are biased upward, especially when the trough months are low (that is, following severe contractions). An alternative base that is clearly independent of the severity of the contraction – the preceding peak – was therefore used to check the results. This naturally reduces the percentage changes, especially for the 1933-1935 recovery (since the 1929 peak so greatly exceeded the 1933 trough), but the tendency for larger rates of growth to follow severe contractions remains substantially valid. The most interesting exception is stock prices, where the most rapid advances relative to the preceding peak occurred when the preceding contraction in business was modest.

The second tendency demonstrated in last year's table was for the initial pace of a recovery to decrease after about fifteen months or so. This was true in all the expansions shown. The second section of the table shows this for the Federal Reserve Board index of industrial production in each expansion; similar results for the other measures of activity can be derived from last year's table.

The tendency reappeared in the current expansion. In most series the annual rates of change in the first six months and in the next nine months following the upturn in August 1954 were not greatly different (final section of table). But in the last nine months of the twenty-four (November 1955 to August 1956), the rate of advance dropped sharply. In the case of the FRB production index there was an actual decline, but this is attributable in part to the steel strike in July. The last column, covering the twelve months from November 1955 to November 1956, skips over the strike period and its immediate aftermath. The sharp decline in the rate of growth shows up nonetheless.

The course of wholesale prices in this expansion differs somewhat from their course in the earlier ones, in that the rate of increase has shown little tendency to slacken. In four of the five earlier recoveries wholesale prices declined during the last nine months of the twenty-four. In the fifth it increased only minutely. The greater rise in commodity prices in the later stages of the present expansion has affected the course of the series expressed in dollars. The retardation is most evident in the physical volume data.

These historical comparisons may be helpful in analyzing the pace of recoveries from future recessions; they are of little help in analyzing the future course of the present expansion. On this, however, we may venture another kind of historical observation. Although the durations of business cycle expansions have been so variable that their average length is of almost no value as a guide to the probable duration of an expansion at its start, it may become more valuable as the expansion proceeds. For example, if the current expansion were to continue through all of 1957, it will have lasted forty months. In the National Bureau's business cycle chronology covering the past 100 years there are only five expansions (out of twenty-four) that lasted as long as forty months: June 1861–April 1865, forty-six months; December 1914–August 1918, forty-four; March 1933–May 1937, fifty; June 1938–February 1945, eighty; and October 1949–July 1953, forty-five.

Four of the expansions encompassed major wars, and one was the recovery from the Great Depression. Clearly, if the present expansion extends through 1957 without a setback it will establish a new precedent.

A book on business cycle indicators that will bring together previously published as well as new papers on the subject and will include a compilation of basic data is in preparation. Among the new contributions will be a paper by W. A. Beckett, of the Department of Trade and Commerce, Dominion of Canada, which describes the behavior of some twenty Canadian indicators that correspond in content to the twenty-one indicators selected by us for the United States. Although there are some differences in detail, on the whole the timing relations among the several series are found to be similar within the two countries. Diffusion indexes for Canada also show patterns characteristic of those for the United States.

GEOFFREY H. MOORE

SUBCYCLES

The subcycle chronology from 1875 through 1941 that was developed last year was put to work this year. What has it revealed? Some preliminary and impressionistic results were presented at the December 1956 meetings of the American Economic Association and will appear in the Proceedings. Here I would like to report briefly on what using the chronology has added to knowledge about what it represents.

In selecting the chronology, I looked for interruptions having substantial diffusion of cyclical tides in aggregate activity. Thus the notion of a subcycle was derived from the notion of a business cycle and differed in degree rather than kind. In what sense do the twenty-three interruptions of business cycles that the chronology locates seem to conform to this notion? I shall discuss two ways in which they do not.

First, almost no reversals would be recorded if one asked whether there were times when many activities were in a *specific cycle* phase running counter to the reference cycle phase. It is only when *specific subcycles* are recognized that the periods of reversals or hesitations appear. In other words, the subcyclical reversals occurring in general business reflect synchronization among reversals in individual outputs, orders, stocks, or prices *of a lesser order than specific cycles.* Such movements have typically been regarded as "random."

These additional movements are usually less severe than specific cycles. The extent to which their recognition adds to the total fluctuation of a particular economic time series may be measured by amplitude calculations. Since these are time consuming, and consequently expensive, they have been made for only seven series from 1875 to 1941. Subcyclical amplitude is the sum of the amplitudes of cycles and of minor subcycles. Table 8 gives the figures. About four-fifths or three-quarters of the total subcyclical amplitude is contributed by specific cycles. Apparently the additional subcyclical movements – the minor ones – though they may represent a strong break in the pace of cyclical expansion or contraction, are not, at least in these series, violent ups and downs. For other series, minor movements are doubtless larger relative to major ones; inventory investment and more

particularly changes in stocks of purchased materials on hand and on order are examples.

If specific subcycles are typically less strong and clear than the specific cycles that we have recognized in the past, the question naturally arises whether they ought to be recognized at all. To do so implies that they are not properly thought of as "random," that is, as phenomena the timing of which economists can afford to ignore. I base this position on two sorts of considerations. First, their possible or probable causes can be imputed. My study of the shoe, leather, hide industry explored their causes in great detail in one sequence and has implications concerning others. Furthermore the fact that they often occur at the same time in many activities is a reason why the term random is not appropriate.

But their concurrence in industry at large, like that of the specific fluctuations, is typically less strong than for business cycles. Consequently, a second way in which subcycles differ from business cycles is that, in addition to representing conjunctures of slighter episodes than specific cycles, they often represent a slighter concentration of these episodes.

This fact was emphasized in the course of selecting the chronology. Choice was based on a group of series taken to represent the course of aggregate output; sampled also were important financial and investment data and sensitive prices. No subcycles were designated that did not seem associated with reversals or at least levelings (not merely retardations) of aggregate industrial production (corrected for long term trend growth in the early years). No subcycles were selected that did not also involve either the financial markets or prices. At certain times, specific subcycles were very common. They were as widely dispersed among the thirty-three series studied as were specific cycle movements during many like reference phases of the forty-month cycle. At other times dispersion tailed off toward the marginal inclusions and exclusions in the chronology and beyond.

At what point in this continuum could chance alone have been responsible for the degree of confluence exhibited at a particular time? Where the point lies – whether above or well below the margin of inclusion in the chronology – is a question that should be answered. Millard Hastay has designed a test intended to do so. Through the good offices of International Business Machines Corporation it is being programmed and run.

To gain even a preliminary notion of the meaning of subcycles in economic activity as

TABLE 8

AVERAGE AMPLITUDE OF SPECIFIC CYCLE AND SUBCYCLE FLUCTUATION, 1875-1914 AND 1921-1941

SERIES	PER MONTH SPECIFIC AMPLITUDE[a]		
	Sub-cycles (*cycle relatives*)	*Cycles* (*cycle relatives*)	*Ratio: Cycle ÷ Subcycle*
Imports	2.50	1.78	0.71
Bank debits outside New York City	1.47	1.18	0.80
Freight ton-miles	1.38	1.05	0.76
Pig iron production	3.65	2.83	0.77
Common stock prices	2.10	1.71	0.81
Price of slab zinc	2.17	1.62	0.75
Price of steel scrap	3.15	2.43	0.77

[a] Amplitude measures are the rise from trough to peak plus the fall from peak to trough expressed as a ratio of the average value of the series during the cycle. This is done for cycles only and then for all subcycles, which thus includes the cyclical amplitude. (Cycle relatives for the latter are computed on the base of the average standing of the cycle rather than for the subcycle only.) The value of the series and turns are taken as a three-month average of the three adjacent months, including the month of turn, which maximize the amplitude.

a whole it is essential to learn in which areas or aspects of economic life they are found more often and in more concentrated form than elsewhere. This question was explored by means of a variety of conformity measures to the reference chronology. They consisted of measures of correspondence with reference turns (the standard National Bureau indexes of conformity) and the percentage of months during which specific subcycles were in like phase with reference subcycles. Calculations were made for all subcycles and also for those that run counter to cyclical phases.

The calculations converge upon a single thesis. The central phenomenon of most of the interruptions of cyclical tides noted in the subcyclical chronology seems to be an alternating over-buying and under-buying of materials. Of the thirty-three test series, good conformity to the interrupting phases is most usual in data reflecting manufacturing output and sensitive prices of certain nonagricultural commodities – commodities whose price is likely to reflect short-term shifts in demand. It is weak in data reflecting financial markets other than security trading.

The relatively profuse information of the interwar period develops the theme. Classification of fifty-seven to ninety different industries for which employment statistics have been compiled suggests that conformity to the counter-cycle reference subcycle phases was negligible in the food industries, in which raw materials must be purchased as they become available. It is strongest in industries in which raw materials have sensitive prices and constitute a relatively large element in total costs. It is stronger for unfinished goods than for finished goods, though this may simply reflect the importance of raw materials. These differences cut through the distinction between durable and semidurable, producer and consumer goods. Information on orders is poor for the interwar period, but such as there is suggests – as does a glance at the fuller recent information – that orders tend to conform well and certainly to have relatively strong subcyclical amplitudes.

The findings need to be tested by recourse to the richer data of recent years. Fundamentally we need to know whether the interruptions of cyclical phases are primarily associated with one set of circumstances at one time and another set of circumstances at another time, or whether there are strong common elements among most of them. Thus far, the second statement seems to apply: there are patterns which tend to recur and these patterns involve alternating over-buying and under-buying of major materials and the resulting cycles of inventory investments. If true, the pure "inventory cycle," actually a cycle in buying, is substantially shorter than commonly supposed.

If buying waves are the common element in most cyclical interruptions, the focus of study should shift from the historic episode – the interruption – to the recurrent process – the buying wave. This shift is also indicated by two other facts. First, time series have shown that the minor movements are not really interesting as historic episodes since they are too slight to cause much hardship or well-being. Second, many of the series most regularly associated with subcycles tend to reverse their direction of movement early. This suggests that an important aspect of subcycles may be their capacity sometimes to act as a trigger mechanism for stronger business fluctuation.

Buying waves in industry at large may be thought of as times when buying waves in individual industries – waves of intrinsic short periodicity – slip into phase with one another. We need to know how this synchronization takes place and why it occurs more generally at one time than another. Such knowledge would not only throw light on integrating mechanisms that cause strong and weak subcycles, it must also illuminate the relationship between buying waves and other economic fluctuations.

Certainly the goal of investigation lies in uncovering the relation of subcycles to major cycles and some provocative hints on this score have already emerged. But discussion of these most interesting matters is premature. In the coming months I plan to complete one or two papers dealing with what the time series

show about when and, particularly, where during the past three-quarters of a century minor business fluctuations seem to have occurred.

RUTH P. MACK

COSTS AND PROFITS

Labor Cost

The influence on cost of changes in the number of man-hours it takes to do a job is modified by changes in wage rates and other circumstances affecting hourly earnings.

We constructed monthly measures of man-hours and labor cost per unit of output in various industries. In some we were able to trace changes through four or more cycles of production, while in others we could locate data for only one or two. Altogether, we have observations on sixty-eight expansions and seventy-five contractions of output in one industry or another. Dividing each expansion or contraction into five stages in the usual manner, we computed an average measure of man-hours per unit for each stage and noted the direction of change in the measure during each of four successive segments of each expansion or contraction in output. The directions of change in man-hours per unit are summarized in Table 9, from which we draw the following conclusions:

1. Declines in man-hours per unit of product predominate in the first segment of expansion, but they become less frequent, and rises more frequent, as expansion proceeds.

2. Even in the later segments of expansion, however, declines are more numerous than rises.

3. Even when there is a rise during later stages, the earlier gains in efficiency are usually not entirely lost. Although rises from stage IV to stage V (the peak of production) occur in twenty-four of our observations, stage V was lower than stage I in all but six.

4. Increases in man-hours per unit predominate in the first segment of contraction, but they become less frequent, and declines more frequent, as contraction proceeds.

5. In all segments, however, except the last, rises are more numerous than declines.

6. Efficiency is usually lower at the trough than at the preceding peak. Although there was a decline in man-hours per unit from VIII

TABLE 9

MAN-HOURS PER UNIT OF PRODUCT:
NUMBER OF CHANGES FROM STAGE TO STAGE OF PRODUCTION CYCLES,
CLASSIFIED BY DIRECTION, TWENTY-TWO INDUSTRIES

From Stage	*To Stage*	*Rises*	*Zero Changes*	*Falls*	*Observations*
I	II	7	2	59	68
II	III	9	1	58	68
III	IV	17	1	50	68
IV	V	24	0	44	68
V	VI	56	0	19	75
VI	VII	48	0	27	75
VII	VIII	45	3	27	75
VIII	IX	37	1	37	75
I	V	6	0	62	68
V	IX	55	1	19	75

For a fuller explanation of cycle stages, see Arthur F. Burns and Wesley C. Mitchell, *Measuring Business Cycles*, page 29.

Industries included: anthracite coal, bituminous coal, meat packing, confectionery, cigars, cotton textiles (to 1948), wool textiles (to 1948), textiles (since 1948), full-fashioned hosiery, men's clothing, women's outerwear, saw mills and planing mills, millwork and plywood, petroleum refining, tires and tubes, cement, primary iron and steel, iron and steel foundries, primary nonferrous metals, nonferrous foundries, tin cans and other tinware, and railroads.

to IX (the trough in production) in thirty-seven of our observations, there was a net decline from V to IX in only nineteen.

If average hourly earnings were stable, labor cost per unit would change in proportion to man-hours per unit. But wage rates often rise during expansions, and the percentage of time paid for at overtime or other penalty rates also increases. During the period for which we have monthly data, wage rates were seldom, if ever, reduced during contractions, but the ratio of penalty time to total time must have diminished.

We treated labor cost per unit in the same way as we treated man-hours per unit. The directions of change in our industries are summarized in Table 10, from which we conclude:

1. Declines in labor cost per unit of product predominated in the first segment of expansion, and became less frequent thereafter. In this respect, labor cost resembled man-hours per unit.

2. But the increase in the frequency of rising costs was great enough to make them predominate in the third and still more in the last segment of expansion.

3. In most cases, labor cost, like man-hours per unit, showed a net decline from the initial trough to the peak. But, for cost, the decline occurred in only 59 per cent of our observations, while for man-hours it occurred in 91 per cent.

4. Rising cost, like rising man-hours per unit, predominated in the first segment of contraction. But while for man-hours the predominance diminished, segment by segment, for cost it increased in all except the last segment. And even in that segment, rises in cost were definitely more common than declines.

5. Labor cost had a net rise from V to IX in 88 per cent of our observations; for man-hours per unit the corresponding percentage is 73.

Our earliest monthly data, except in the case of railroads, are for 1932. In the business contractions of 1929-1932, 1920-1921, and probably in earlier ones of comparable severity, cuts in wage-rates were common. There may have been a stronger tendency toward falling cost in such contractions. To get some information for these earlier years, as well as for industries without monthly figures in later years, we computed annual indexes of labor cost per unit. Nine of ten manufacturing industries with contracting production in 1920-1921, and thirteen of fourteen in 1929-1932, had a net decline in labor cost. On the other hand, ten of fifteen with declining output in the less severe contraction of 1923-1924 had rising cost, as did five of nine in the minor contraction of 1926-1927.

Apart from their cyclical variation, the post-war annual figures are interesting because of their divergent trend. According to our esti-

TABLE 10

LABOR COST PER UNIT OF PRODUCT:
NUMBER OF CHANGES FROM STAGE TO STAGE OF PRODUCTION CYCLES, CLASSIFIED BY DIRECTION, TWENTY-TWO INDUSTRIES

From Stage	*To Stage*	*Rises*	*Zero Changes*	*Falls*	*Observations*
I	II	11	0	57	68
II	III	26	0	42	68
III	IV	37	0	31	68
IV	V	47	1	20	68
V	VI	59	0	16	75
VI	VII	61	1	13	75
VII	VIII	62	0	13	75
VIII	IX	47	1	27	75
I	V	28	0	40	68
V	IX	66	0	9	75

See notes to Table 9.

mates, man-hours per unit in manufacturing fell 30 per cent from 1946 to 1955, while labor cost per unit increased 21 per cent.

During the first half of 1957 I expect to complete a paper on labor input and cost. Industries differ considerably in these matters, and we have long enough records to support separate analyses for some of them. In many, there is a strong inverse relation between total output and man-hours per unit, Output cycles often do not coincide with business cycles, and average hourly earnings are likely to be affected by general business conditions. It will be desirable, therefore, to compute cost averages for business cycle stages as well as for production stages.

Reflection of Costs in Commodity Prices and Profit Margins

The foregoing discussion dealt with labor cost alone, and indeed neglected a minor portion even of that, since the basic data pertain only to "wage earners" or "production workers." The compensation of such workers, however, is a large component of total cost, including materials and overhead items like depreciation and property taxes. Total cost per unit of product probably rose and fell with labor cost in many instances. Rises in cost are necessarily reflected either in higher prices or in smaller margins of profit. They have therefore sometimes been regarded as one of the factors that bring business expansion to an end. Whether or not they have this effect, our investigation so far suggests that rises in cost do commonly occur during the late stages of an expansion. It would, however, be preferable to have data on total cost, including the nonlabor components.

If business enterprises do encounter rising costs, when do they absorb them, and when do they pass them on to their customers? More generally, do the relations among costs, prices received, and profit margins differ at different stages of business cycles?

Unfortunately, estimates of total cost per unit of product are hard to make, because comparable data on total cost and on product are hard to find, especially on a monthly or quarterly basis. Railroads are an exception. We brought up to date our transport study monthly figures on operating expenses per traffic unit and the operating ratio (ratio of expenses to revenues). Marking off the rising and falling phases in each, we found that they were in phase with each other during 481 of the 572 consecutive months, or 84 per cent of the time. Higher costs usually meant a smaller profit margin and vice versa. The longest out-of-phase period was the thirty-one months from December 1945 to July 1948, in which cost continued to rise (it had already been rising for two and a half years), but a series of general increases in freight rates made a fall in the operating ratio possible.

The Federal Trade Commission-Securities and Exchange Commission quarterly financial report on manufacturing corporations contains estimates of costs and sales for major groups of manufacturing corporations, beginning in 1947. For nine of the groups production indexes that seem to match the financial data are available from other sources. But a check of annual summations of the financial data against corresponding Internal Revenue Service financial data indicates that the coverage of the FTC-SEC estimates apparently fluctuates from year to year. We intend to adjust them for changes in coverage. Dividing the cost figures for each group by the appropriate production index, we will get unit cost figures comparable to the cost ratios. The latter are probably not seriously affected by changes in coverage.

Rough annual estimates of unit cost and cost ratios, based on IRS and other data, are possible for other periods and industries. We made year-by-year comparisons of unit cost with the cost ratio for all manufacturing, manufacture of durables, manufacture of nondurables, and six individual manufacturing industries.

The comparisons suggest that when cost falls during business expansions, enterprises can usually keep the benefit; prices rise or at least do not fall as much as cost. When cost rises during an expansion, firms have per-

haps a fifty-fifty chance of protecting their margins by raising prices in proportion or more than in proportion to cost. When cost falls during a business contraction, margins nevertheless decline; we infer that prices fall even more. It is not surprising, then, that when cost rises during a contraction, prices apparently cannot be raised enough to offset the change in cost.

I presented these conclusions to the September 1956 meeting of the American Statistical Association in a report called "Cyclical Changes in Costs, Prices, and Profit Margins." The findings will be combined with the railroad data and whatever we learn from the FTC-SEC material to form the basis for another paper.

Reflection of Profits in Stock Market Prices

I am planning a paper on this subject that will take into account the effect of dividend changes as well as profits.

THOR HULTGREN

AVERAGE WEEKLY HOURS

Timing and amplitude measures for average weekly hours have been computed for the following periods and industries. (The first is the National Industrial Conference Board series; the others are Bureau of Labor Statistics series.)

Interwar period:

- 1920-1941, for 20 manufacturing industries
- 1935-1941, for 15 manufacturing industries
- 1935-1941, for 13 nonmanufacturing industries

Postwar period:

- 1947-1955, for 21 manufacturing industries
- 1947-1955, for 14 nonmanufacturing industries

I am now drafting a paper on the results of the analysis. A summary of some of the findings on turning points of average hours in manufacturing and nonmanufacturing industries follows.

Manufacturing Industries

It is a well-known fact that aggregate measures of average weekly hours tend to lead turns in general business conditions. Below are some detailed observations based on individual industries.

For manufacturing industries about 250 turning points in hours could be compared with those in general business conditions (reference turns). At three-quarters of these turns hours lead, but the percentage of leads is higher at peaks (80 per cent) than at troughs (67 per cent). The average lead at all turns is about 4 months, but again the lead is longer at peaks (5 months) than at troughs (3 months).

The average dispersion of turning points, based on the industrial classification used, is 4 months; it is about the same at peaks and at troughs. This dispersion would, of course, place a larger number of turns in hours behind reference turns at troughs than at peaks – provided that the distributions of turning points are roughly symmetrical. Judging from the observations, this appears to be the fact.

Why are there more and longer leads at peaks than at troughs? In principle this could be caused by the long-term decline in hours, which would tend to hasten peaks and delay troughs in hours. But the difference in behavior can also be observed where the downward trend is absent or negligible; thus we must look for other explanations.

Peak output is typically produced under conditions of overtime and overtime pay. Under these conditions an economic incentive exists to decrease weekly hours at the first sign of a decline in business activity. Also, at high output levels managers prefer to adjust labor input by reducing hours rather than employment to keep the establishment's work force together in case the decline should prove temporary. These considerations have no analogy at troughs. Moreover, also at troughs, there exist reasons for the lead of hours over employment. If an establishment is on short-time, hours will be increased before new men are hired. And the costs of training new labor

may deter hiring until the need for more workers becomes imperative.

We did not find any evidence that the leads in some industries were consistently larger than those in others. However, although hours led rather consistently at all reference turns, the leads were markedly longer at some turns than at others, and in a few instances the normal tendency of hours to lead apparently did not hold.

Examples of this are the peak at 1929 and the trough of the Great Depression. The reason for the lag in average hours at the 1929 peak is not entirely clear. The timing at the subsequent trough presents a special problem. Between 1932 and 1935 the aggregate series as well as many separate industries show two troughs with an intervening peak in 1933. The second downturn must be explained in terms of work-sharing policies and NRA codes that provided for reduction in full-time hours.[1] In general, the more reasonable comparison is between the first trough and the reference turn (March 1933), in which case the usual lead results. However, in some industries the intervening recovery is too mild to justify the recognition of a 1932 trough, in which case the upturn in hours lags behind the business cycle turn.

Nonmanufacturing Industries

The behavior of hours in nonmanufacturing industries deviates markedly from that in manufacturing. This conclusion stems from observations on 13 nonmanufacturing industries for the interwar period (covering the 1937 and 1938 reference turns) and 14 industries for the postwar period (covering four reference turns). The following table compares some basic timing measures for the above nonmanufacturing industries with those for 15 manufacturing industries during the interwar period and 21 manufacturing industries for the postwar years (all measures are based on BLS data).

In manufacturing practically all hours series showed turns in the neighborhood of reference cycle reversals, while in nonmanufacturing only 60 per cent of the turns could be matched. And manufacturing industries led at 86 per cent of all matchable turns while the corresponding percentage for nonmanufacturing industries was 51 per cent. Furthermore, the average lead was 5½ months in manufacturing and only about one month in nonmanufacturing. Finally, at 5 of 6 analyzed turning points, the dispersion of turns by specific industries was greater in nonmanufacturing than in manufacturing industries. However, the tendency of hours to lead more at peaks than at troughs was found both in manufacturing and in nonmanufacturing industries.

Why is it that nonmanufacturing industries conform less, lead in fewer instances, lead by fewer months, and show wider dispersion of turning points? Part of the answer must lie in the heterogeneity of the industries bracketed under the vague name, "nonmanufacturing." They include mining, retail trade, railroads, utilities, building, personal services, and so forth – industries whose only common denominator is that they are not producing fac-

[1] See Leo Wolman, *Hours of Work in American Industry*, Bulletin 71.

	Reference Turns Covered	*Matchable Specific Turns:*		*Leads:*		
	No.	*No.*	*%*	*No.*	*% of Matchable*	*Average Timing, Mos.*[a]
Manufacturing:						
Interwar, 1935-41 (15 indus.)	30	30	100	26	87	−3.4
Postwar, 1947-55 (21 indus.)	84	81	96	70	86	−6.1
Full period	114	111	97	96	86	−5.4
Nonmanufacturing:						
Interwar, 1935-41 (13 indus.)	26	20	77	8	40	+0.4
Postwar, 1947-55 (14 indus.)	56	29	52	17	59	−2.4
Full period	82	49	60	25	51	−1.2

[a] (−) indicates leads, (+) lags.

tory products. Hours in some of these industries, like wholesale trade and retail trade, may show little cyclical behavior altogether. Others, like building, may experience cycles that are well known to deviate from those shown by business activity at large. The behavior of still others, such as personal service industries, may well be dominated by factors only loosely related to those determining business activity and factory output. However, since hours in nonmanufacturing industries constitute roughly two-thirds of all hours worked, they should receive adequate attention in any analysis of average hours.

Plans

We are now in the process of summarizing the results of amplitude measures for the series listed at the beginning of this report. The remaining part of the investigation concerns the intracyclical behavior of average hours – an analysis which will bear additional fruit when intracyclical variations in hours can be compared with those in employment. At present we are using the existing reference cycle stage measures for this analysis. It is possible, however, that we also may be able to investigate intracyclical behavior of hours with the help of the dispersion analysis programmed for the Univac by Julius Shiskin and Harry Eisenpress.

GERHARD BRY

ANALYSIS OF BUSINESSMEN'S EXPECTATIONS

During the year I settled on the final dimensions of my study of business expectations. The study concentrates on the Dun and Bradstreet surveys, which provide individual-firm reports on the anticipated directions of change in various operating variables, followed by corresponding reports on realized directions of change in the same variables. Simple counts of such reported directions of change are referred to as "diffusion" data; and diffusion surveys, both of realized business experience and of business expectations, have become quite numerous since World War II. Particularly relevant to my study have been the reported results of investigations by Oskar Anderson, Jr., Hans Theil, and others of surveys of this type conducted on a monthly basis by the IFO-Institute for Economic Research in Munich, Germany.

Earlier reports of my work were concerned with the nature of diffusion data, their relation to more familiar economic aggregates such as output, prices, and employment, and the accuracy of businessmen's anticipations reported in diffusion form. This work has been checked and extended, new forms of diffusion data have been examined, and the forecasting usefulness of business anticipations in diffusion form has been explored as a function of the size of reporting establishments.

The heart of my study, however, is an investigation of the interrelationships of business anticipations and their effects on realized business behavior. The Dun and Bradstreet reports, both of actual and of expected directions of change, cover a substantial range of operating variables: selling prices, employment, sales, profits, and inventories for durable and nondurable goods manufacturers, wholesalers, and retailers, as well as new orders for the two groups of manufacturers. It is reasonable to regard these reports as a summary of the interrelationships of business expectations and decision taking under conditions of uncertainty, and I seek to show this through a special study of the survey data on inventories.

The inventory study will employ two types of models, one to explain the formation of inventory expectations, and the other to explore the effects of such prior expectations on realized inventory behavior. From a statistical point of view the two types of models can be investigated separately. But they jointly throw light on the role of business anticipations and intentions in shaping realized business behavior and in turn being shaped by it. Moreover, the models of realized behavior are designed to aid in forecasting aggregate inventory investment on a current basis.

The investigations are to be carried out for the period beginning with the second quarter of 1952 and ending with the first quarter of 1957. Separate investigations will be made

for durable goods manufacturers, nondurable goods manufacturers, wholesalers, and retailers. This new work should be completed during the spring, after which I plan to conclude the writing of my study along lines of the following tentative outline:

1. Introduction
2. Early postwar research in business expectations
3. Origin of diffusion-type surveys
4. Nature of the Dun and Bradstreet survey
5. Theoretical basis of diffusion studies
6. Accuracy and verification analysis
7. The formation of business expectations
8. Economic behavior under uncertainty
9. Conclusion

MILLARD HASTAY

INVENTORY CYCLES SINCE 1938

I plan to analyze systematically the available data on manufacturers' sales, output, and inventory from 1939 through 1955, with particular emphasis on the postwar years. The investigation is being carried out within the general framework of hypotheses and methods used by Moses Abramovitz in his *Inventories and Business Cycles, with Special Reference to Manufacturers' Inventories.* The principal data to be analyzed are the monthly inventory and sales of the Office of Business Economics, individual commodity stocks and shipments series (Abramovitz's series or comparable ones), monthly inventory by stage of fabrication series for selected aggregate and two-digit industry classifications (Office of Business Economics and unpublished series and series with restrictions on publication).

To deflate the stage-of-fabrication series, I have constructed finished goods and purchased materials deflators for each industry classification in the American economy. Although the analysis is not yet complete, it is clear that the deflated series tend to behave in the manner Abramovitz observed in prewar data.

Turns in the deflated purchased materials series typically occur earlier than corresponding turns in the deflated finished goods data, tending to lead specific cycle output turns at peaks and to lag at troughs. The finished goods series display inverted tendencies, lagging all output turns but turning upward well before output peaks and downward well before output troughs. The OBE finished goods series exhibit less tendency to inverted behavior than do the limited number of finished nonfarm commodity stock series which I have been able to assemble.

The most striking finding is that there is a well-developed cyclical pattern in quarter-to-quarter changes (inventory investment) in most of the OBE purchased material and finished goods series. Peaks and troughs in purchased materials investment lead peaks and troughs in finished goods investment, but both sets of peaks and troughs tend to occur within six months before or after output turns. Significantly, investment turns in the OBE finished goods series have approximately the same timing as investment turns in most of the finished nonfarm stock series.

The general plan for the manuscript under preparation is as follows:

1. The general pattern of inventory behavior during the interwar, World War II, and postwar periods
2. The behavior of finished goods inventories and inventory investment, by industry and commodity
3. The behavior of purchased materials inventories and inventory investment, by industry and commodity
4. The behavior of total inventories and inventory investment, by industry
5. The theory of inventory behavior; a restatement in the light of empirical findings
6. The use of inventory statistics; a critique of existing methods

T. M. STANBACK, JR.

CYCLICAL BEHAVIOR OF MANUFACTURERS' ORDERS

The study is an analysis of the behavior of manufacturers' new orders in the context of cyclical fluctuations in the activity of the corresponding industries and of business cycles.

The collection of monthly data on new and unfilled orders, on output, and on shipments,

by industry, has been completed. The sample for new orders consists of sixty series covering various periods between 1870 and the present, mostly in the interwar and the recent years. It contains some duplication as it includes major industry aggregates as well as their components.

The principal sources for the current comprehensive data are the Department of Commerce *Industry Survey* and a new compilation by Standard and Poor's. Most of the individual industry or product data are trade association statistics.

All the series are now available in seasonally adjusted form. They have been classified according to whether the goods they cover are durable or nondurable, used primarily by producers or by consumers, made typically to order or to stock. The last distinction, which helps to explain the interindustry differences in the relations between new orders, production, and shipments, was particularly difficult to establish. It required an examination of the production and distribution policies followed in the various industries and of pertinent statistics such as the ratios of stocks to unfilled orders. Also a division was made between the order series in physical quantities and in current values. Finally, data on new orders gross of cancellations were distinguished from the net figures. For a few items both gross and net series were secured, which made it possible to study the cyclical changes in cancellations directly.

The major sections of the draft manuscript are as follows:

1. *Nature and Limitations of Order Data.* A comprehensive table gives the basic description and the various classifications of materials used.

2. *Relations between New Orders, Production, and Shipments.* Measures of timing, conformity, and amplitude based on comparisons of the corresponding specific cycles in commitments, output, and deliveries, are presented and factors that influence the response of industry to cycles in ordering are discussed. The factors are, primarily, the production period, the degree of utilization of capacity, backlogs of unfilled commitments, and the relative importance for the given industry of (a) production to specific orders; (b) production not commited in advance but scheduled with the aid of own order figures; and (c) production guided by other indicators of market demand.

3. *Manufacturers' Orders and Business Cycles.* Their timing of orders at peaks and troughs, their conformity to expansions and contractions, and the intensity of the cyclical response is analyzed. This behavior is linked to the relationship between orders and output in individual industries. Broadly speaking, incoming orders lead the business cycle because they lead the output of products to which they give rise and stimulate ordering of other goods needed for that production.

4. *New Orders as Indicators of Cyclical Revivals and Recessions: An Appraisal.* The usefulness of new order series as early indicators of cyclical revivals and recessions is evaluated. The appraisal is based on the findings of the preceding section on the length and regularity of order leads. A major concern is with the presence in the order data of additional specific cycles, and of short or erratic movements. The latter are relatively large and frequent and probably offer the main limitation to the use of order series to forecast or identify business cycle turns. The possibility of combining a number of order series into a reliable index of cyclical changes in commitments is also being explored.

Some findings obtained earlier from a sample of series somewhat less than half the size of our present collection may be mentioned. For individual investment goods as well as for the major durable goods industries, new orders received by manufacturers persistently lead the corresponding output and shipments. Lapses from this leading pattern are few and mostly explicable on some special grounds. Although the leads vary considerably in length, both between successive cycles in one activity and between different industries or products, the central tendency is clearly towards leads of substantial duration (about

two-thirds of the entire list are longer than three months).

More important, new orders for capital equipment and durables in general show a strong tendency to move not only ahead of activity in the same industry but also ahead of general business activity, at both peaks and troughs. Again the range of these timing measures is considerable but their central tendency is well-expressed. To some extent, the general similarity in patterns between the two sets of observations simply reflects the fact that output and shipments are in most industries closely associated with the business cycle as defined for the purposes of the National Bureau's reference cycle analysis. But there is another factor in this similarity. If new orders move through a specific contraction phase yet continue to run above the level of deliveries (so that the backlogs of unfilled work are still rising), output and shipments need not decline at all. If such developments take place in several major industries (as they did in 1951 following the early Korean spurts in ordering), then new orders in a large part of the economy will have experienced 'extra' contractions with no counterparts in either the specific industry activities or the general business trends. Conversely, an *expansion* in new orders is likely to remain an 'extra' one if it expires before it reaches the level of current industrial operations.

VICTOR ZARNOWITZ

CYCLES IN FOREIGN TRADE

My study of cyclical fluctuations in United States and British trade balances has been revised after staff review and will shortly be submitted to the Directors. The introductory chapter sets forth the object, scope and method of the study.

Chapter 2 deals with the foreign trade balance of the United States, 1879 to 1955, in its relation to domestic business cycles and to cycles in world trade. It shows that the balance typically fell in American business contractions and rose in expansions. The inverse movements were most regular and largest in the neighborhood of peaks in general business. In relation to world cycles, on the other hand, the balance shows high positive conformity. The two relationships are compatible because the main changes in the balance occurred at times when the American and the world cycles moved in opposite directions.

Analysis of the British trade balance along the same lines is presented in Chapter 3. The years before and after World War I had to be treated separately here since the British balance moved with British business cycles in the earlier period, but oppositely in the later period. In particular the sharp increase in the balance which preceded (and the fall which followed) British business peaks, 1882 to 1913, contrast with the steep decline before (and rise after) such turns in the interwar period.

In Chapter 4, I describe the derivation of the world import series which is the basis of the world cycle chronology used in the preceding chapters. This chronology is compared to some others based on alternative approaches. The diffusion of cycles in world trade is also measured. The findings of the study are summarized in Chapter 5, and some observations are made on the impact of the trade balance movements on the course of business cycles in the two countries.

ILSE MINTZ

REGIONAL AND INDUSTRIAL FLUCTUATIONS

A manuscript reporting an investigation of cycles in manufacturing employment in thirty-three states is in preparation. There are four cycles identified in the period between 1914 and 1953, with dates roughly conforming to peaks and troughs in business activity.

The investigation is concerned with a number of simple hypotheses designed to elicit the basic structure of state cycles in manufacturing employment. These hypotheses are:

1. There are permanent differences between states in the total severity (decline plus rise) of cycles in manufacturing employment. These differences are systematic in character in the

sense that the distribution of states by order of severity of one cycle will bear a strong relation to the distribution for other cycles. Further, these differences will change in a systematic fashion.

2. Differences between states in the total severity of fluctuations are partially explained by the industrial composition of each state. That is, holding constant the behavior of each industry, differences in industrial composition will partially generate the observed differences in severity between states.

3. After account is taken of industrial composition, differences remain which are stable from cycle to cycle. These differences appear to be related to the long term growth trends operative in each state.

Standardized series of manufacturing employment in thirty-three states for cyclical turning points during the years 1948 to 1953 have been constructed. I had been using the old series constructed from national production worker employment indexes. In certain respects they proved inadequate to generate the distribution of actual state amplitudes of manufacturing employment cycles. The reason is that the state data for this period include both production and nonproduction personnel in the manufacturing employment totals. Because production worker employment shows more cyclical variability than total manufacturing employment, the old series provided more variability than necessary for explanatory purposes.

GEORGE H. BORTS

THE APPLICATION OF ELECTRONIC COMPUTERS TO THE ANALYSIS OF ECONOMIC STATISTICS

The National Bureau is exploring ways in which electronic computers can be used to improve our understanding of the current business situation. Electronic computers permit the development of new and improved measures for current economic series and more powerful analyses of historical business fluctuations. We plan to make intensive analyses in a few economic areas that could not previously be satisfactorily studied because the calculations involved would have been too expensive. We are also preparing electronic computer programs for some of the important statistical techniques used by economists.

The National Bureau is being guided in this project by an advisory committee of distinguished economists and statisticians under the chairmanship of W. Allen Wallis of the University of Chicago. The Sperry-Rand Corporation and the International Business Machines Corporation have each made available time of one of their most powerful computers for this work – the Remington-Rand Univac and the IBM 704. A grant from the National Science Foundation covers expenses for auxiliary services.

Staff explorations and committee discussions of desirable electronic computer programs have already ranged widely, covering advanced mathematical approaches to economic analysis as well as the elaboration of present tested methods. Six projects are currently under way.

Relations among Components and Their Aggregates

A comprehensive set of computations, which embodies and expands the National Bureau's techniques for measuring the behavior of components in relation to aggregates, has been programmed for the Univac, and the results for test runs are now being examined. The present program supplies measures of the dispersion of changes between any two periods for components of aggregates or for members of a family of time series. The measures included are:

1. Frequency distributions of percentage rates of change, both absolute and relative
2. Arithmetic means of all rates of change, the rises alone and the falls alone
3. Standard deviations of the rates of change
4. Deciles of the rates of change
5. Diffusion indexes, both total and net percentage rising
6. Distributions showing for each month the number of series rising, falling, and not

EXHIBIT 1

Actual Sample "Print-Out" of Detailed Measures of Dispersion, Thirty-four Monthly Economic Series, September-October 1953 (reduced approximately one-half)

34 STAT IND PERCENTAGE CHANGE: 9 53 TO 10 53

PER CENT CHANGE	NO OF SERIES	% OF SERIES	CUMUL. %
OVER +30.0			
+25.1 TO +30.0			
+20.1 TO +25.0			
+15.1 TO +20.0			
+10.1 TO +15.0			
+ 9.1 TO +10.0			
+ 8.1 TO + 9.0			
+ 7.1 TO + 8.0			
+ 6.1 TO + 7.0			
+ 5.1 TO + 6.0			
+ 4.1 TO + 5.0	1	2.9	2.9
+ 3.1 TO + 4.0	1	2.9	5.9
+ 2.1 TO + 3.0			5.9
+ 1.1 TO + 2.0	2	5.9	11.8
+ 0.1 TO + 1.0	7	20.6	32.4
0.0	1	2.9	2.9
- 0.1 TO - 1.0	9	26.5	64.7
- 1.1 TO - 2.0	6	17.6	38.2
- 2.1 TO - 3.0	2	5.9	20.6
- 3.1 TO - 4.0	1	2.9	14.7
- 4.1 TO - 5.0			11.8
- 5.1 TO - 6.0			11.8
- 6.1 TO - 7.0			11.8
- 7.1 TO - 8.0	2	5.9	11.8
- 8.1 TO - 9.0	1	2.9	5.9
- 9.1 TO -10.0	1	2.9	2.9
-10.1 TO -15.0			
-15.1 TO -20.0			
-20.1 TO -25.0			
-25.1 TO -30.0			
UNDER -30.0			
TOTAL	34		

PERCENT RISING (ZEROS DIVIDED) TOTAL + 33.8 NET - 32.4

AVERAGE DURATION OF RUN - 0.9

		NO. OF CONSECUTIVE MONTHS						
		1	2	3	4	5	6+	TOTAL
SERIES RISING	%	17.6	8.8	2.9			2.9	32.4
SERIES FALLING	%	29.4	8.8	11.8	11.8		2.9	64.7
SERIES UNCHANGED	%		2.9					2.9

	RISES	FALLS	TOTAL
ARITHMETIC MEANS	+ 1.2	- 2.5	- 1.2
STANDARD DEVIATION			2.9

DECILES

1	2	3	4	5	6	7	8	9
- 7.1	- 2.1	- 1.6	- 0.9	- 0.7	- 0.2	+ 0.1	+ 0.6	+ 1.1

EXHIBIT 2

Actual Sample "Print-Out" of Summary Measures of Dispersion, Thirty-four Monthly Economic Series, June 1954-June 1956 (reduced approximately one-half)

SECOND MONTH	PERCENT RISING (ZEROS DIVIDED) TOTAL	NET	AVERAGE DURATION OF RUN	ARITHMETIC MEANS RISES	FALLS	TOTAL	STANDARD DEVIATION
7 54	+ 36.8	- 26.4	- 0.4	+ 4.2	- 2.9	- 0.3	6.6
8 54	+ 48.5	- 3.0	- 0.1	+ 2.2	- 2.3	- 0.1	3.5
9 54	+ 67.7	+ 35.4	+ 0.5	+ 2.9	- 3.6	+ 0.8	5.7
10 54	+ 61.8	+ 23.6	+ 0.7	+ 5.6	- 2.1	+ 2.6	9.6
11 54	+ 80.9	+ 61.8	+ 1.6	+ 3.5	- 13.0	+ 0.4	8.7
12 54	+ 76.5	+ 53.0	+ 2.0	+ 4.2	- 2.8	+ 2.5	5.0
1 55	+ 70.6	+ 41.2	+ 1.9	+ 2.8	- 2.1	+ 1.3	3.6
2 55	+ 83.8	+ 67.6	+ 2.4	+ 2.9	- 3.4	+ 1.9	3.6
3 55	+ 63.2	+ 26.4	+ 1.6	+ 3.3	- 1.6	+ 1.5	5.0
4 55	+ 60.3	+ 20.6	+ 1.3	+ 2.4	- 5.0	- 0.5	5.6
5 55	+ 73.5	+ 47.0	+ 1.9	+ 4.3	- 2.9	+ 2.4	5.3
6 55	+ 69.1	+ 38.2	+ 1.5	+ 3.5	- 2.7	+ 1.6	5.0
7 55	+ 60.3	+ 20.6	+ 1.0	+ 3.8	- 4.4	+ 0.6	6.0
8 55	+ 58.8	+ 17.6	+ 0.8	+ 3.7	- 3.3	+ 0.9	5.0
9 55	+ 75.0	+ 50.0	+ 1.4	+ 2.2	- 3.5	+ 0.8	3.3
10 55	+ 63.2	+ 26.4	+ 1.1	+ 2.4	- 4.8	- 0.3	5.4
11 55	+ 76.5	+ 53.0	+ 1.5	+ 3.7	- 5.1	+ 1.6	7.2
12 55	+ 67.7	+ 35.4	+ 1.5	+ 2.2	- 6.1	- 0.5	6.2
1 56	+ 58.8	+ 17.6	+ 1.0	+ 6.1	- 1.8	+ 2.8	8.6
2 56	+ 60.3	+ 20.6	+ 1.0	+ 2.3	- 2.4	+ 0.4	3.7
3 56	+ 54.4	+ 8.8	+ 0.8	+ 5.5	- 4.0	+ 1.2	9.0
4 56	+ 72.1	+ 44.2	+ 1.4	+ 1.9	- 6.4	- 0.4	8.5
5 56	+ 52.9	+ 5.8	+ 0.9	+ 4.5	- 4.5	+ 0.3	8.3
6 56	+ 34.4	- 31.2	- 0.2	+ 4.6	- 2.8	- 0.2	7.4

DECILES

	1	2	3	4	5	6	7	8	9
7 54	- 5.7	- 3.7	- 1.7	- 0.8	- 0.2	+ 0.0	+ 0.2	+ 0.8	+ 4.1
8 54	- 3.9	- 1.2	- 0.8	- 0.4	+ 0.0	+ 0.1	+ 0.4	+ 2.0	+ 4.0
9 54	- 4.2	- 0.6	+ 0.0	+ 0.1	+ 0.4	+ 0.5	+ 0.9	+ 1.8	+ 6.4
10 54	- 3.4	- 0.9	- 0.3	+ 0.0	+ 0.5	+ 1.4	+ 1.7	+ 2.4	+ 8.1
11 54	- 11.0	+ 0.1	+ 0.4	+ 0.8	+ 1.1	+ 1.7	+ 2.8	+ 5.6	+ 9.1
12 54	- 3.4	- 0.3	+ 0.2	+ 0.5	+ 1.4	+ 2.7	+ 3.6	+ 5.2	+ 9.6
1 55	- 2.0	- 0.7	+ 0.0	+ 0.3	+ 0.9	+ 1.5	+ 1.6	+ 3.4	+ 5.6
2 55	- 1.0	+ 0.1	+ 0.3	+ 0.5	+ 1.7	+ 2.2	+ 3.5	+ 4.1	+ 6.5
3 55	- 2.5	- 1.1	- 0.2	+ 0.2	+ 0.7	+ 0.9	+ 1.6	+ 2.2	+ 5.1
4 55	- 8.3	- 4.0	- 0.4	+ 0.0	+ 0.3	+ 1.0	+ 1.4	+ 2.0	+ 3.1
5 55	- 1.9	- 0.4	+ 0.7	+ 0.9	+ 1.2	+ 1.8	+ 3.8	+ 5.4	+ 9.3
6 55	- 2.3	- 0.7	+ 0.0	+ 0.4	+ 0.7	+ 0.8	+ 1.6	+ 5.2	+ 8.0
7 55	- 6.5	- 3.1	- 1.1	+ 0.0	+ 0.3	+ 0.8	+ 1.9	+ 4.9	+ 7.9
8 55	- 4.9	- 3.3	- 1.1	- 0.2	+ 0.5	+ 0.9	+ 1.3	+ 2.9	+ 8.8
9 55	- 3.7	- 1.2	+ 0.5	+ 0.7	+ 1.0	+ 1.3	+ 2.1	+ 3.3	+ 4.3
10 55	- 6.3	- 3.8	- 0.2	+ 0.0	+ 0.4	+ 0.7	+ 0.8	+ 2.0	+ 4.4
11 55	- 0.9	+ 0.0	+ 0.1	+ 0.3	+ 0.9	+ 1.5	+ 3.0	+ 5.0	+ 8.9
12 55	- 5.2	- 1.1	+ 0.0	+ 0.1	+ 0.6	+ 0.8	+ 1.5	+ 2.8	+ 5.3
1 56	- 2.0	- 0.9	- 0.6	+ 0.0	+ 0.4	+ 0.5	+ 0.9	+ 3.1	+ 12.2
2 56	- 4.0	- 1.2	- 0.7	+ 0.0	+ 0.1	+ 0.2	+ 1.0	+ 2.4	+ 4.2
3 56	- 6.0	- 3.0	- 0.9	- 0.2	+ 0.3	+ 0.6	+ 1.4	+ 3.2	+ 6.9
4 56	- 5.1	- 1.9	+ 0.0	+ 0.5	+ 0.7	+ 1.1	+ 1.5	+ 2.1	+ 5.1
5 56	- 3.6	- 1.8	- 1.2	- 0.6	+ 0.1	+ 0.4	+ 1.3	+ 2.7	+ 6.7
6 56	- 6.0	- 4.9	- 1.9	- 0.6	- 0.2	- 0.1	+ 0.0	+ 0.7	+ 2.1

changing for one, two, three, four, five, and six or more consecutive months, and their corresponding average durations of run

A sample "print-out" showing these measures for thirty-four monthly economic series is given in Exhibits 1 and 2. The figures, for a pair of months, took Univac less than fifteen seconds to compute.

We are applying the program experimentally to several types of data, including:

1. About one hundred economic indicators
2. Retail sales reported to the Census Bureau, by store
3. Shipments of gray iron castings reported to the Census Bureau, by plant
4. Employment and hours reported to the Bureau of Labor Statistics, by plant and by industry

Data for three or four years will be covered in the individual store and plant surveys; the period since 1919 for the indicators.

An important potential use of this program is that it will provide detailed and comprehensive measures of the performance of the individual enterprises in an industry, which an individual enterprise could use as a basis for appraising its own performance. Another will be to show currently how the large and the small enterprises in an industry are faring. We expect it will contribute, also, to an understanding of how an expansion or contraction spreads through the economy during the course of a business cycle.

The Standard National Bureau Business Cycle Measures

These measures are now being programmed for the IBM 704. The National Bureau technique produces a set of cyclical timing, amplitude, duration, pattern, and conformity measures for any given monthly, quarterly, or annual time series, such as steel production, the wholesale price index, or unemployment.

The technique has been tested and improved over the years and is fully described in Arthur F. Burns's and Wesley C. Mitchell's *Measuring Business Cycles*. The principal factor hampering its use in the past, both within and outside the National Bureau, has been the time required to make the computations, and also to train clerks in the computing routine.

The electronic computer program will first reproduce as closely as possible the technique of analysis as it was developed and tested by Burns and Mitchell. The prompt availability of this program will aid current National Bureau studies of business cycles and of economic growth. It will probably be feasible to include most of the specific cycle tables and all the reference cycle tables in the electronic computer program.

While the basic method is being programmed, various refinements, elaborations, and extensions will be explored and tested. Possibilities suggested by Burns and Mitchell, which they would have pursued had resources been available, will be taken up, together with ideas contributed by other members of our staff and other students of business cycles.

For example, we plan to compute tables showing the percentage changes in a given series during the first three months, four months, five months, and so forth, of each business cycle expansion or contraction covered. Such tables will facilitate the use of the data for current analysis. As another example of the kind of extension possible, the type of smoothing done in computing the cycle relatives could be varied according to the relative magnitudes of the irregular and cyclical components of the series, that is, according to the I and C measures described below. We expect that in due course a new improved method will be programmed to replace the present standard method.

Improving Seasonal Adjustments

The Census Bureau seasonal adjustment program started with a familiar method – the standard ratio-to-moving-average method – and went on to the development of a more general and more comprehensive one. Although the results are satisfactory for most series, experience has pointed to several potential improvements.

The improvements include the introduction of a variable method of adjusting ends of se-

ries according to the magnitude of the irregular fluctuations and further experimental work on the types of moving average curves most suitable for obtaining seasonal adjustment factors and cycle-trend curves for different types of series. We also hope to improve the method of identifying extreme seasonal-irregular ratios, introduce a more precise test of the existence of seasonality in the original observations and in the seasonally adjusted series, and improve the charting routine (see *Charting*). Experiments designed to develop appropriate techniques for making such improvements are under way.

Times-Series Decomposition

The Census Bureau seasonal program includes computations which yield estimates of the irregular (I), cycle-trend (C), and seasonal (S) components of each series. The average monthly amplitude of each component is computed by averaging the month-to-month percentage changes without regard to sign. The measures were first computed to provide a basis for selecting appropriate types of moving average curves to fit to the seasonal-irregular ratios for each month.

However, they appear to have other uses. Thus the $\bar{I}/\bar{C}$ ratio indicates whether the irregular or cyclical component dominates, on the average, the month-to-month changes shown by a series. In most of the series for which the ratio has so far been computed, $\bar{I}$ is greater than $\bar{C}$, and this suggests that for these series month-to-month changes are not reliable indicators of cyclical movements. Consequently we include in the electronic computer program the computation of the mean irregular-cyclical ratios not only for consecutive months ($\bar{I}_1/\bar{C}_1$), but also for two month spans ($\bar{I}_2/\bar{C}_2$), three month spans ($\bar{I}_3/\bar{C}_3$), and so on.

This measure may help us determine better the number of months that must pass before we can assign cyclical significance to changes in seasonally adjusted series. Thus if $\bar{I}$ is greater than $\bar{C}$ in a month-to-month computation and in a two-month-span computation, but smaller in a three-month-span one, we would conclude that three-month comparisons are the shortest that, on the average, have cyclical significance. We have labeled this measure *"MCD,"* an abbreviation for "months required for cyclical dominance."

We have also added to the program the computation of the average duration of run for the seasonally adjusted series, the irregular component, the trend-cycle curve, and the short-term moving average of period equal to *MCD*. These measures are helpful in compiling diffusion indexes and in making tests for the existence of non-random movements in series. For example, the average duration of run for I provides a basis for testing the validity of the I-C separation. We find that for very smooth and for very erratic series other graduation formulas should be sought as estimators of the cyclical-trend component, in place of the weighted fifteen-term Spencer formula presently used.

The measures are shown in Table 11 for eighteen monthly economic indicators that have been selected to judge tentatively the economic significance of the results. They suggest interesting hypotheses about the behavior of these components of time series and their relations, which will be tested against a larger sample of series.

We are now computing the measures for a sample of about one hundred and fifty series previously selected as broadly representative of many types of economic activity. The measures are being computed separately for two periods, 1947-1956 and 1919-1939. Our objectives here are to determine the average relations between the cyclical, seasonal, and irregular components of time series; how the relations change over time and particularly from stage-to-stage of the business cycle; and how this knowledge can be helpful in interpreting current changes in economic series.

Test for Concurrence among Short Cycles in Business Activities

In connection with Ruth Mack's work on subcycles, an experiment is currently under way, using the IBM 704, to test the significance of the degree of synchronization of subcycles among time series. The experiment will use

some of the characteristics of subcycles observed in a special collection of thirty-three long economic time series.

Drawing upon these general characteristics, experimental subcycles will be generated at random within realistic business-cycle movements of the thirty-three test series. The process will be repeated perhaps one hundred times for each series; the degree of sychronization of subcycles in each set of thirty-three experimental series will be measured; the consolidated information for the one hundred sets will point to a critical region by means of which the sychronization actually observed in the case of each reference subcycle may be individually tested for significance. The experiment was designed by Millard Hastay for the purpose Mrs. Mack has described.

Charting

Univac programs are now available for point charts showing the original, seasonally adjusted, and smoothed data, and the seasonal-irregular ratios and seasonal indexes for each month (see Exhibit 3). We are trying to improve and extend these chart programs.

TABLE 11

MEASURES OF DIFFERENT TYPES OF ECONOMIC FLUCTUATIONS, IN EIGHTEEN MONTHLY ECONOMIC INDICATORS, 1947-1956

Indicators	$\overline{I}$	$\overline{C}$	$\overline{S}$	$\overline{I}/\overline{S}$	$\overline{S}/\overline{C}$	$\overline{I}/\overline{C}$	$\overline{I}_2/\overline{C}_2$	$\overline{I}_3/\overline{C}_3$	$\overline{I}_4/\overline{C}_4$	$\overline{I}_5/\overline{C}_5$	*MCD*	*CI*	*Average Duration of Run: I*	*C*	*MA*
Leading series:															
Business failures, liabilities	15.3	3.2	9.6	1.6	3.0	4.8	2.4	1.6	1.2	1.0	6	1.6	1.4	5.8	3.0
Industrial stock prices	1.5	1.2	1.1	1.4	0.9	1.2	0.7	0.5	0.3	0.2	2	2.3	1.8	9.8	3.6
New orders, durables	4.6	2.1	6.3	0.7	3.0	2.2	1.2	0.7	0.6	0.4	3	1.9	1.5	10.4	4.3
Residential building	7.8	2.7	11.3	0.7	4.2	2.9	1.5	0.9	0.8	0.6	3	1.8	1.5	7.7	3.9
Nonresidential building	13.0	3.0	10.8	1.2	3.6	4.3	2.0	1.4	1.1	0.8	5	1.6	1.4	8.9	3.4
Hours worked, manufacturing	0.3	0.2	0.6	0.6	2.7	1.7	0.9	0.6	0.4	0.4	2	2.5	1.8	7.7	3.7
New incorporations	4.0	1.3	8.4	0.5	6.7	3.2	1.6	0.7	0.9	0.6	3	1.5	1.5	9.5	4.0
Wholesale prices, basic commodities	1.4	1.3	1.2	1.1	1.0	1.1	0.7	0.5	0.3	0.2	2	3.2	1.8	9.0	3.6
Roughly coincident series:															
Nonagricultural employment	0.2	0.3	0.8	0.3	2.7	0.8	0.5	0.3	0.2	0.1	1	3.6	1.8	12.9	3.6
Unemployment, total	3.9	3.0	9.3	0.4	3.1	1.3	0.8	0.5	0.4	0.3	2	2.6	1.7	7.2	3.5
Bank debits outside New York City	3.0	0.8	6.1	0.5	7.7	3.8	1.7	0.8	0.9	0.6	3	1.4	1.4	16.4	3.2
Freight carloadings	3.2	1.2	5.0	0.6	4.2	2.7	1.4	0.8	0.7	0.6	3	1.8	1.5	7.7	3.0
Industrial production	0.7	0.7	2.3	0.3	3.0	0.9	0.5	0.4	0.2	0.2	1	3.5	2.8	10.6	3.5
Nonfood wholesale prices	0.2	0.4	0.2	0.7	0.6	0.4	0.3	0.2	0.1	0.1	1	8.8	2.0	12.8	8.8
Lagging series:															
Personal income	0.6	0.6	4.5	0.1	7.8	1.0	0.6	0.4	0.2	0.2	1	2.8	1.6	18.8	2.8
Retail sales	1.7	0.6	6.5	0.3	11.3	2.9	1.6	1.0	0.8	0.5	3	1.7	1.5	8.8	3.6
Installment credit	0.3	1.7	0.8	0.4	0.5	0.2	0.1	0.1	0.1	0.1	1	16.4	2.2	23.0	16.4
Inventories, manufacturing	0.3	0.9	0.4	0.7	0.4	0.3	0.2	0.1	0.1	0.1	1	10.4	2.3	16.3	10.4

Explanation of column headings:

$\overline{I}$ = Average month-to-month percentage change without regard to sign in irregular component.

$\overline{C}$ = Average month-to-month percentage change without regard to sign in cycle-trend component.

$\overline{S}$ = Average month-to-month percentage change without regard to sign in seasonal component.

$\overline{I}/\overline{C}$, $\overline{I}_2/\overline{C}_2$, $\overline{I}_3/\overline{C}_3$, etc. = Percentage ratios of average monthly amplitude of irregular to cyclical components for consecutive months, for two month spans, three month spans, etc.

MCD = Months required for average amplitude of cyclical component to exceed that of irregular component.

Average duration of run = Average number of consecutive monthly changes in the same direction.

Average duration of run, *MA* = Average duration of run in moving average of seasonally adjusted series, with period equal to *MCD*.

Note: Neither all the values of the average amplitudes, nor all the deviations from one in the ratios, are statistically significant. For example, there is probably no seasonal pattern in stock prices, yet the average seasonal amplitude is shown as 1.1 per cent. Studies necessary to define statistically significant values for these measures have not yet been made.

The expected average duration of run for a random series is 1.5, with two standard error limits of 1.36 and 1.75, and for a simple moving average of a random series 2.0, regardless of the period of the moving average.

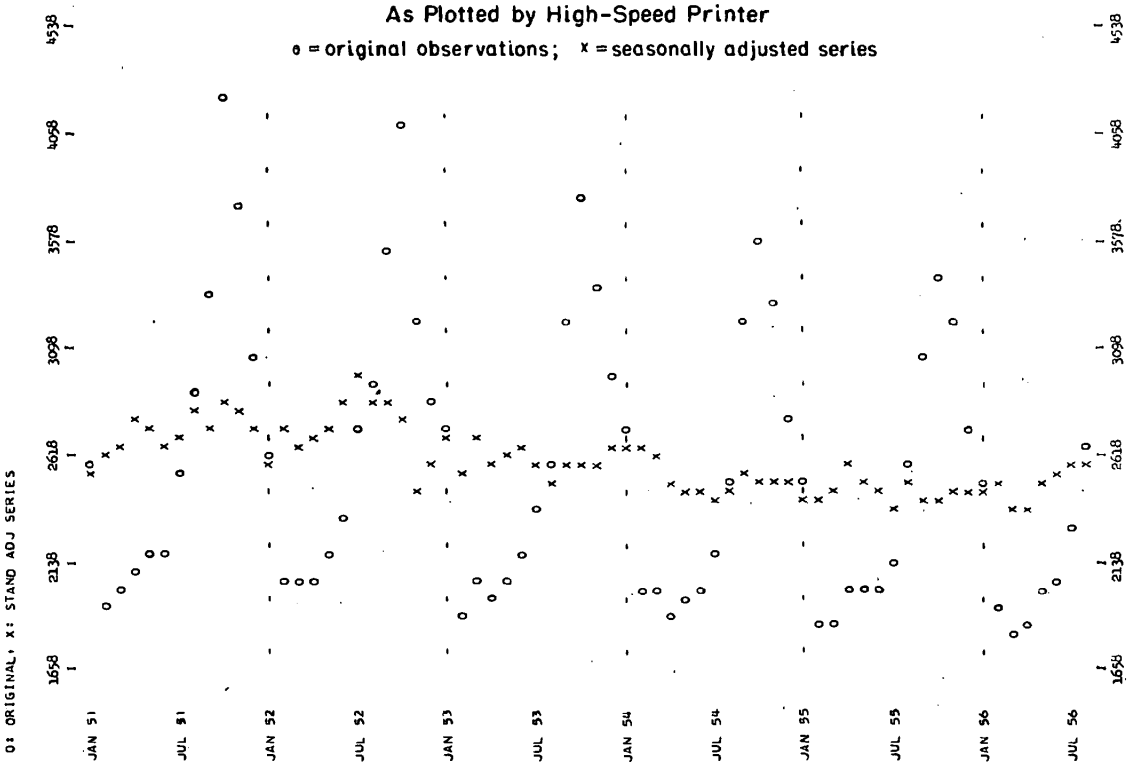
Source: For a description of the series, see Geoffrey H. Moore, *Statistical Indicators of Cyclical Revivals and Recessions*, Occasional Paper 31.

EXHIBIT 3

Actual Sample of "Point Charting" of United States Farm Income, 1951-1956
(reduced approximately one-half)

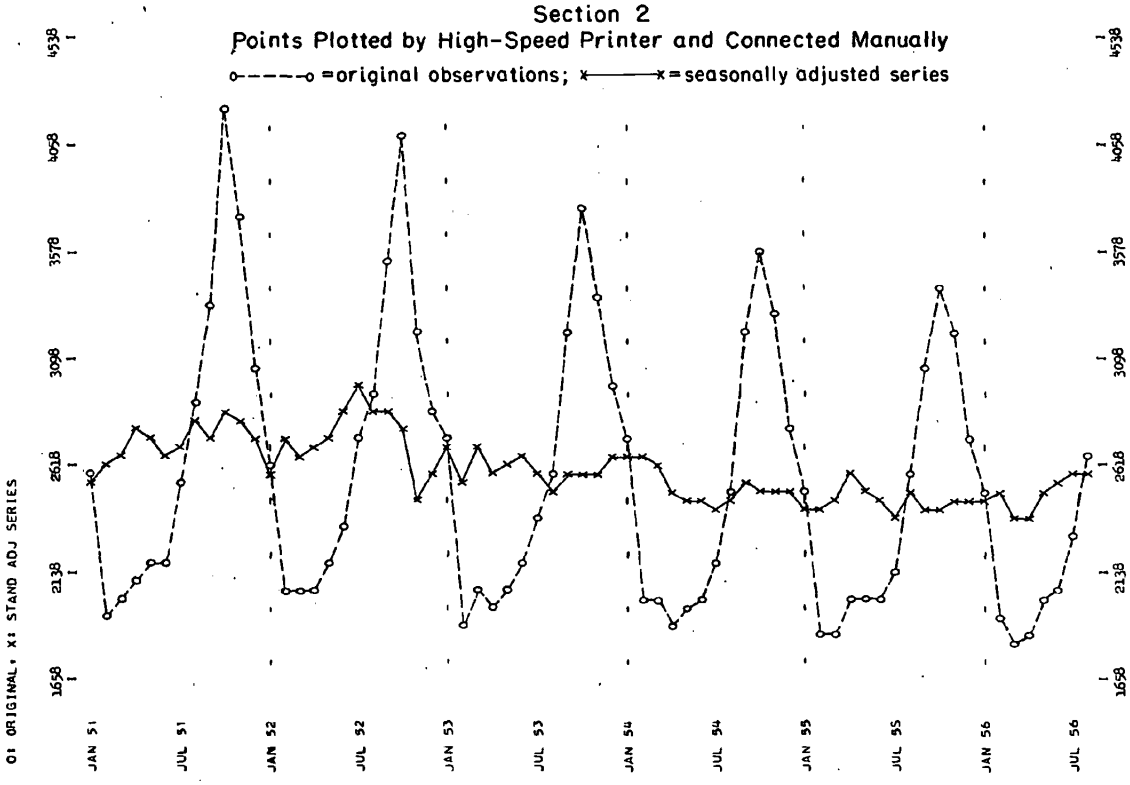
Section 1
As Plotted by High-Speed Printer

o = original observations; x = seasonally adjusted series



Section 2
Points Plotted by High-Speed Printer and Connected Manually

o-----o = original observations; x——x = seasonally adjusted series



The method of determining size of scale in relation to the width of the paper sometimes results in curves that do not show small changes. Suggestions that have been offered to handle this difficulty include the plotting of logarithms instead of natural numbers, the plotting of series in smaller time segments (say a maximum of ten years), and the fixing of the scale by use of a measure shorter than the full range of the seasonally adjusted series, perhaps the range of the trend-cycle curve instead, leaving a few points to be plotted manually. These and other possibilities are being investigated.

GEOFFREY H. MOORE
JULIUS SHISKIN

OTHER STUDIES

Four studies were published during 1956 and early 1957:

Daniel Creamer, *Personal Income during Business Cycles*

Ruth P. Mack, *Consumption and Business Fluctuations: A Case Study of the Shoe, Leather, Hide Sequence*

Policies to Combat Depression, Special Conference Series 7

The Measurement and Behavior of Unemployment, Special Conference Series 8

Three reports are in press:

Milton Friedman, *A Theory of the Consumption Function*

W. Braddock Hickman, *Corporate Bond Quality and Investor Experience*

Oskar Morgenstern, *International Financial Transactions and Business Cycles*

Four are in preparation that deal in part with business cycles:

Gerhard Bry, "Wages in Germany, 1871-1945"

John Firestone, "Cyclical Behavior of Federal Receipts and Expenditures since 1879"

Geoffrey H. Moore, "Harvest Cycles"

Julius Shiskin and Harry Eisenpress, "Seasonal Adjustments by Electronic Computer Methods"

Studies of trends and cycles in the money supply and of the quality of credit in booms and depressions are reported in Section 1.

3. *Economic Growth*

ECONOMIC GROWTH IN THE UNITED STATES SINCE 1870

A plan for work on one aspect of a general study of economic growth in the United States was approved last spring. Active work began in September. The plan limits the scope of the study in three ways:

1. It focuses attention on the period since the Civil War, because data for earlier decades, especially production data, are far less adequate.

2. It concentrates on capital formation and financing since this is a crucial process for which a considerable volume of new materials have been recently compiled.

3. It will be chiefly concerned, at least initially, with the problem of the "trend cycles" or "long swings," the protracted surges and relapses in the rate of growth that appear in many aspects of economic life and give the appearance of general waves with a duration of about twenty years. For reasons mentioned below, this last aspect of our plan is subject to reconsideration.

These limitations are intended to provide focus for the work, not to set narrow boundaries for the investigation. To understand the behavior of capital formation one must trace its connection, for example, with the growth of population and the labor force, with international and internal migration, with regional development, with the rate of output and changes in the structure of production, with the availability of savings and changes in the channels and costs of finance.

The "long swings," which form the temporal framework in which I now expect to organize the observations, can be discerned in the statistics of other countries and in this country before the Civil War, although the relative scarcity of reliable records reduces the range of activities in which they can be observed. And the long swings since the Civil War in this country will need to be compared with the

experience of other countries and earlier times.

Certain aspects of the long swings have already been described by earlier writers. A succession of investigators discerned a long wave in the volume of building construction. Walter Isard found a long wave in the construction of transportation facilities that is closely correlated with the long building cycle. G. H. Evans presented evidence of long waves in the number of new incorporations in a number of industries before the Civil War. These can be shown to conform well to Isard's transportation-building cycles. Moreover, in the post-Civil War period, when the trend of incorporations rose steeply, the rate of growth of new incorporations displayed swings which conform to the more general swings in rate of growth of output noted below.

Simon Kuznets' work first suggested the existence of more general twenty-year growth cycles. In *Secular Movements in Production and Prices* (Houghton & Mifflin, 1930), he observed fluctuations of about twenty years' duration in the rate of increase of production of many individual commodities, in the rate of rise of many prices, and in several other kinds of time series.

These observations were carried further by Arthur F. Burns in *Production Trends in the United States since 1870.* Again, swings roughly twenty years in length appeared in the rate of output growth of many commodities. Further, Burns established the fact that the "trend cycles" in individual commodities tended to concur in time and to be matched by a concurrent trend cycle in indexes of aggregate industrial production, in price indexes and in certain financial series.

This evidence of the generality of the phenomenon is bolstered by Kuznets' later work. The same swings appear in the rate of growth of gross national product, in labor productivity, and in the volume of immigration. Other writers suggest the presence of a similar swing in population growth and internal migration in this country and in the economies of foreign countries. Finally, a notable aspect of Burns' study of trend cycles was his observation that each of the retardations in the rate of growth of output was marked by a business depression of exceptional severity.

Yet, the significance of these long swings is not yet established. It may be that they are only accidental variations in the severity or duration of ordinary business cycles, which assume the appearance of long swings when their effects are stretched out and smoothed by moving averages or similar devices. Or, even if they do reflect forces that operate over periods longer than business cycles, now accelerating and now retarding the growth of productivity and resources, the forces at work may be predominantly haphazard and irregular. Burns and Wesley Mitchell, in *Measuring Business Cycles,* found little evidence to suggest that business cycle behavior varied systematically between serious depressions. Nor does older work suggest an invariant relation between building cycles and trend cycles in output. These results, however, need to be reviewed to take account of a larger range of data and of hypotheses other than those considered by Mitchell and Burns.

These doubts cannot now be resolved. Further work may suggest a better principle by which to divide the span of history into significant subperiods. For the time being, however, there are a number of advantages in organizing data in periods suggested by the long swings and in observing the behavior of capital formation in its relation to other variables during such periods. I hope, of course, that this procedure will help throw some light on the significance of the long swings themselves. Another advantage is that of tracing the causes and characteristics of the serious depressions which have marked past periods of retardation in growth.

It is implausible to suppose that the antecedents of severe depressions are to be found entirely within the preceding standard business cycle expansion or in the depression itself. Presumably they also represent the cumulation of developments that take place over a period of two or more standard business cycles. If so, the organization of data in units of experience bounded – or otherwise marked – by the occurrence of severe depressions should add

to an understanding of these serious incidents.

Further, the observed fluctuations remain prominent episodes in our economic history even if there is no stable mechanism which alternately stimulates and checks our rates of growth in a true twenty-year cycle. Perhaps these surges and relapses are connected with the exploitation of particular constellations of investment opportunities arising in the course of our industrial and geographical development. If so, the character of the opportunities and of our responses to them ought to be identified and described. In addition, a protracted fluctuation in a central economic variable like the rate of growth of output – whatever its causes – is bound to be connected with, or to carry in its train, far-reaching changes in many aspects of economic and noneconomic life. The establishment of such associations would add something to our understanding of the process of economic development.

The apparent connection of the long swings with the occurrence of protracted depressions suggests that the fluctuations we observe in the secular rate of growth of the economy may arise either from:

1. Unevenness in the rate of expansion of our *capacity* to produce (i.e., either our labor force or our supply of capital or the productivity of these resources may grow at an uneven rate), or

2. Unevenness in the *intensity* with which we utilize our productive capacity (i.e., we may suffer depressions of varying severity and duration so that the average degree of underemployment of resources varies from time to time).

These sources of fluctuation in the secular rate of output growth, moreover, are interconnected. The decline in investment during a protracted depression means a reduction in the growth of capital. Past depressions have also been marked by a decline in immigration and therefore, in the rate of growth of the labor force. There may also be cyclical fluctuations in the participation of the various elements of the population in the labor force. In addition, output fluctuations associated with the swings from prosperity to depression affect the pace at which the productivity of *employed* resources grows because of changes in the intensity of use of such resources and perhaps also because of cyclical shifts in the composition of output. Finally, we must consider the suggestion that retardations in the rate of growth of output *capacity,* when they act to limit the growth of output, are one cause of the onset of protracted depressions, because a retardation in output growth reduces the need to build up inventories and other capital equipment required to support current production and sales.

Consideration of these various sources of long swings in output growth makes it clear that it is impossible to separate the study of long swings from that of business cycles. An understanding of long swings must be sought through a search for the causes of the recurrence of protracted depressions and by learning the effects of such depressions on the growth of resources and productivity.

This is not to say that there would be no fluctuations in the secular rate of output growth in the absence of protracted business depressions. There is no reason to suppose that, if resources were always fully employed, labor supply, capital stock and productivity would grow at steady rates. The importance of the fluctuations in the growth of resources and productivity in a fully-employed economy can be established, however, only by separating them from similar fluctuations associated with business depression and recovery. And, since the data of experience refer to an environment characterized by varying degrees of unemployment, the only practicable means of effecting a separation is to attempt to gain an understanding of the (two-way) relation between the severity and duration of business cycles and the growth of productive capacity. As stated, we hope this study will throw some light on this question.

Some aspects of the changes associated with protracted surges and relapses in the rate of growth have been suggested by earlier writers. A pronounced fluctuation in the dispersion of rates of growth has been carefully described

by Burns. Brinley Thomas, and Kuznets and Ernest Rubin have studied the relation between international migration and long swings in output growth. Dorothy S. Thomas has indicated the possibility of an associated swing in internal migration. The present study proposes to attack the problem in a more general fashion.

Work has been started along a number of lines, and I hope that in the coming months it may be possible to prepare preliminary reports on the following subjects:

1. A survey of earlier work on long swings to catalog and assess their empirical findings and the theoretical notions to which they have led.

2. An analysis of broad indicators of economic activity to establish the approximate temporal boundaries of the postulated long swings in this country.

3. A description of the pattern of behavior of aggregate output, of its major components, and of the composition of output by broad categories.

4. A review of the relation between construction activity and long swings in output growth. This will make use of the more recent estimates of construction activity. It will cover construction of transportation facilities as well as building construction, and public as well as private activity, and attempt to establish the degree to which the various categories of construction have developed according to a common pattern.

MOSES ABRAMOVITZ

INTERSTATE DIFFERENCES IN ECONOMIC GROWTH

Economic growth in the United States since 1880 has been widely diffused. According to our estimates real per capita income has risen in every state – almost always by at least 50 per cent and usually by much more.

The changing pattern of interregional differences is brought out in Table 12 and Chart

TABLE 12

STATE PER CAPITA INCOME AS PERCENTAGE OF NATIONAL LEVEL, AVERAGE OF STATES IN EACH REGION, 1880-1950
(*per cent*)

	1880	*1900*	*1920*	*1950*
United States	100.0	100.0	100.0	100.0
New England	129.1	120.3	111.4	98.4
Middle Atlantic	128.6	125.4	123.0	118.8
East North Central	99.0	101.1	103.8	111.3
West North Central	91.8	97.6	84.4	93.9
South Atlantic	45.3	46.9	61.1	70.3
East South Central	50.5	48.3	51.8	57.8
West South Central	60.2	57.7	68.1	72.4
Mountain	191.0	142.1	105.3	99.4
Pacific	163.7	149.0	125.6	113.2

Note: The income concept is personal income excluding transfer income, and refers essentially to the income received by the residents of a state. It was not possible to adjust for interregional differences in price level or trend. The per capita incomes for the United States, in 1929 dollars, are: 1880, 302.1; 1900, 414.0; 1920, 578.0; and 1950, 897.3.

The regional classification corresponds to the geographical divisions of the Bureau of the Census except that Delaware and Maryland have been included in the Middle Atlantic division and the District of Columbia omitted.

The entries for 1920 and 1950 are averages of annual data for 1919-1921 and 1949-1951 respectively.

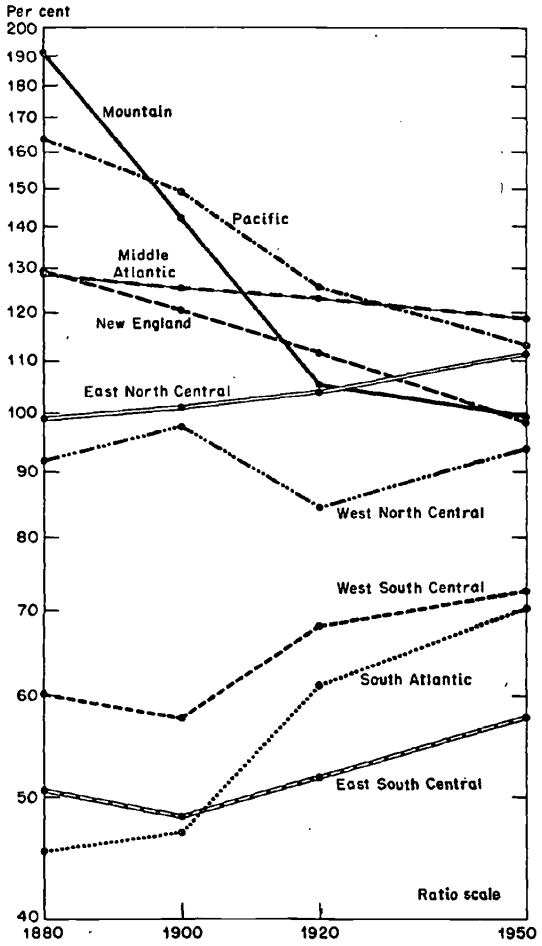
Source: 1880 and 1900: Estimates derived in present study. 1919-1921: Based on Maurice Leven, *Income in the Various States,* adjusted for conceptual comparability. 1949-1951: Data for 1949 from "State Income Payments in 1951," *Survey of Current Business,* August 1952, and for 1950 and 1951 from "State Income Payments in 1952," *Survey of Current Business,* August 1953.

2. Their entries were derived by expressing the figure for each state at any given date as a percentage of the countrywide level and then averaging arithmetically the values for the states in a given region.

The most striking feature is the widespread convergence in relative levels of per capita income – in every region the average in 1950 is closer to the countrywide level than in 1880, a minor exception occurring in the case of the East North Central states. In the eastern and western regions this trend dates from 1880, but in the South generally only from 1900. Not much confidence can be placed on the dating of these movements, however, since the data are for only four points in time. Indeed, it is quite likely that some divergence occurred during the decade of the twenties.

CHART 2

State per Capita Income as Percentage of National Level, Average of States in Each Region, 1880-1950



Also of interest is the shift in relative position of the regions. At the end of last century the highest income levels prevailed in the West. During the ensuing decades, however, the states in this region, particularly the Mountain states, suffered a relative decline. By 1950 the highest average level was to be found in the Middle Atlantic region, with the Pacific and East North Central close behind. The three southern regions continued to lag behind the rest of the nation, but within the South, the South Atlantic showed a noticeable gain relative to the other two.

High per capita incomes have usually been associated with high average service income in both agricultural and nonagricultural industry, a high proportion of the population in the labor force and of the labor force in nonagricultural industry, and a high level of property income receipts per capita (Table 13). The convergence in per capita income levels appears to have been most noticeably and consistently associated with convergence in property income levels and industrial structure, as measured by the relative distribution between agricultural and nonagricultural industry (Table 14). However the trend in interstate differences in nonagricultural service income per worker and in the proportion of population at work has also tended in this direction. Interestingly enough, there is little evidence of a narrowing of interstate differences in service income per worker in agriculture.

A paper presenting these and other findings from our study of trends in state income and utilizing data on industrial shifts and interregional flows of persons and capital to explain the patterns is nearing completion. When finished, it will be published in the *Memoirs* series of the American Philosophical Society together with other analyses from the University of Pennsylvania Study of Population Redistribution and Economic Growth. A volume presenting the estimates of state population, migration, labor force, manufacturing, and income for selected dates from 1870 to the present is now in press.

TABLE 13

RANK CORRELATION (τ) BETWEEN PER CAPITA INCOME AND DESIGNATED VARIABLE AT SPECIFIED DATE

	1880	*1900*	*1920*	*1950*
Agricultural service income per worker	0.54	0.65	0.59	0.50
Nonagricultural service income per worker	0.61	0.61	0.55	0.76
Property income per capita	0.57	0.75	0.78	0.70
Proportion of population in labor force	0.43	0.41	0.53	0.66
Proportion of labor force in nonagricultural industry	0.73	0.62	0.69	0.45

Note: Service income includes wages, salaries, and proprietors' income. Property income includes interest, dividends, and rent. The correlation coefficient is Kendall's τ. (Maurice G. Kendall, *Rank Correlation Methods,* London: Griffin and Co., 1948). For rankings of forty-eight states, significance at the 1 per cent level is achieved when $\tau = 0.25$.

TABLE 14

AVERAGE (DISREGARDING SIGN) OF STATE PERCENTAGE DEVIATIONS FROM NATIONAL AVERAGE FOR SPECIFIED SERIES, 1880-1950

(*per cent*)

	1880	*1900*	*1920*	*1950*
Total income per capita	46.9	34.0	24.4	18.5
Agricultural service income per worker	35.3	40.8	38.9	34.2
Nonagricultural service income per worker	20.7	18.6	11.2	12.2
Property income per capita	49.6	44.4	38.0	29.6
Proportion of population in labor force	14.2	8.3	7.3	5.5
Proportion of labor force in nonagricultural industry	37.8	27.6	19.6	9.8

Upon completion of the paper, I plan to attempt estimates of regional income for 1840, so that a fuller picture of the nineteenth century trend may be secured, and comparison made between the eras before and after the Civil War.

RICHARD A. EASTERLIN

ECONOMIC GROWTH IN THE UNITED STATES BEFORE 1870

My work to date has been along three related lines of research:

Economic Growth in the United States, 1815-1860. The first part of the study will deal with the international economic relations of the United States; the second, with regional developments and interregional economic relationships; and the third, with the economic growth of the economy as a whole. I am currently gathering material on the flow of goods (services), people, capital, and ideas between the United States and other countries for the first part.

United States Balance of Payments, 1789-1860. The study will attempt to revise and improve on the work of Charles J. Bullock, John H. Williams, and Rufus S. Tucker, "The Balance of Trade of the United States," *Review of Economic Statistics,* July 1919. Annual estimates have been developed of shipping earnings, immigrants funds and remittances, and ship sales. Annual calculations of the other invisible items and revised annual estimates of the value of merchandise trade will be completed soon.

The Movement of Ocean Freight Rates,

1753-1913. While it has been generally recognized that declining costs of transport were an important aspect of the expansion of the Western World, there have been no comprehensive quantitative studies made of the course of ocean freights prior to 1869. I have gathered data covering a fairly wide sample of routes and cargoes for the years from 1753 to 1913. From 1869 on, these data are supplemented by the well-known collection of ocean freight rates kept by the E. A. V. Angier Company and after 1884 by the collection of rates of the British Board of Trade.

The result is a continuous picture of ocean freight rates for more than a century and a half. The collection of data has been completed; the task of organizing and analyzing it lies ahead.

DOUGLASS NORTH

INDEXES OF UNITED STATES FOREIGN TRADE SINCE 1879

Work on the indexes of American exports and imports has progressed to the point where a fairly clear picture of the final shape of the technical aspects of the study appears.

We classified all of the quarterly commodity data on United States foreign trade, 1879 to 1923, into about one hundred minor groups according to a three-dimensional classification. One dimension is a commodity-group listing similar to that used by the Census Bureau, the second is the degree of manufacture (major economic class breakdown used in the current Department of Commerce indexes of foreign trade), and the third is the distinction between agricultural and nonagricultural commodities.

For each minor group we will have value data for as much of the period as is covered by the commodity detail in the source, and for most of the groups we will have price and quantity indexes as well. These will include not only Fisher "ideal" indexes, but also, as a by-product of the computation, Paasche and Laspeyre indexes, which should enable us to shed light on the direction and importance of shifts in weights as well as on price movements themselves.

All of the minor group indexes will be on IBM punch cards for combination into larger and more economically significant groups. We will also have on punch cards a complete quarterly record of United States foreign trade during these years in the greatest possible commodity detail to use in reconstituting groups or examining the behavior of individual commodities.

In combination with the Department of Commerce indexes for the years after 1923 and interpolating indexes for 1923 to 1939, our new indexes will permit us to inspect the whole panorama of American international trade from 1879 to the present in quarterly series broken down into major economic classes.

The first use to which the indexes are being put is in the study by Ilse Mintz of cycles in foreign trade. We hope to make further use of the indexes in examining long term trends in United States foreign trade, in dissecting the trends in trade into quantity and price movements, and in viewing them against the background of the movement of domestic prices and output. An important element in the latter step has been supplied in work done previously by Phyllis A. Wallace in which the foreign trade commodity classification was fitted into the domestic industry classification and ratios of imports to consumption and exports to production were computed for each industry.

We expect to complete within the next six months the remaining collection and key punching of quantity data for imports and the computation of minor group indexes. These will be combined with a set of notes describing their coverage and composition in detail, and describing the use of price data from sources other than the foreign commerce compilations themselves.

ROBERT E. LIPSEY

TRENDS IN WAGES AND PRODUCTIVITY IN THE UNITED STATES

Wages

The study of money and real wages in the

United States from 1860 to the middle 1950's, undertaken with the assistance of a grant from the Alfred P. Sloan Foundation, is now in its final stages.

Clarence D. Long of Johns Hopkins University has submitted a manuscript on "Wages in United States Industry: 1860 to 1890."

Albert Rees and his assistants are completing the collection of data on wages and the cost of living for the period 1890 to 1914. It was found necessary for this period to construct new series of both wages and the retail prices of several components of the cost-of-living index. During the past year work on the wage series was completed and most of the available data were collected on rents, the retail prices of furniture, home furnishings, and clothing, and a start has been made on collecting from public utility companies the rates for illuminating gas supplied to domestic users in large cities. Rees plans to complete his monograph covering this period in the course of 1957.

I expect to finish a volume on the behavior of money and real wages, 1914 to 1956, in the course of the year. When these manuscripts and the volume by John Kendrick on productivity (reported below) are completed, it will be possible to prepare an interpretative essay on the relation between wages and productivity over the span of nearly a century.

LEO WOLMAN

Productivity

The basic estimates of productivity and related variables for the total economy and major industrial groupings 1889-1953 have been completed. In some instances, the final estimates differ somewhat from those underlying the analysis contained in the interim report *Productivity Trends: Capital and Labor* (Occasional Paper 53), but the broad conclusions are unaffected. The sources and methods used in the estimates are described in ten appendixes to the final monograph.

The chapter of the monograph dealing with productivity in the economy as a whole has been drafted. In addition to a description of national productivity changes over short and long periods, there are analyses of the composition of output as it affects productivity growth; of the interrelationships of productivity, factor prices, and product prices; and of the distribution of the productivity increment between labor and capital as influenced by changes in relative factor prices.

I hope that the entire manuscript will be ready for review before the end of the year.

JOHN W. KENDRICK

PRICES AND WAGES IN THE SOUTH DURING RECONSTRUCTION

During the year I completed the first draft of my study of the economy of the South during the turbulent Reconstruction years following the Civil War. In it, I estimate gross farm income in the South, discuss the behavior of prices and the South's changing terms of trade, and compare the wage rates prevailing in the South with those in the North.

During the Civil War, the northern blockade and high military demand stimulated the output of southern manufacturers, offsetting part of the wartime destruction. In agriculture there were no offsets to the destruction of capital, the depletion of livestock, and the burning of homes and barns. Furthermore, Negroes, predominantly employed in agriculture, could not instantly take the responsibilities given to them as free men. Because of the destruction of capital and disorganization of the labor force, the output of cotton during the first five postwar years fell to only 51 per cent of its prewar level, the output of hay fell to 37 per cent, and the output of corn fell to 66 per cent.

The prices of farm products were relatively high during the early postwar years, which prevented gross southern farm income from falling as sharply as physical output. As early as 1870 gross southern farm income exceeded its prewar level. During the decade of the 1870's farm capital was replaced and herds restocked. Plantation owners became more efficient in organizing their labor force and Negroes grew in responsibility. In consequence

crop outputs steadily rose. However, during this period of expanding physical output, gross farm income was greater than its prewar level only twice – in 1875 and in 1880. Falling prices of farm products during the 1870's prevented gross income from rising more rapidly.

The price level in New Orleans mirrored the price level in the North. From the third quarter of 1863 through the third quarter of 1864, the increased stock of money and the high war demand drove up commodity prices in both areas. Between the fourth quarter of 1864 and the second quarter of 1865, the goods produced in the area formerly controlled by the Confederate government entered the national market, and the stock of money contracted. Consequently, the price level in both areas fell. After the war, the price level reversed itself and rose for a few months. Then, from the first quarter of 1866 through the second quarter of 1879, the price level drifted downward in both areas.

Not all prices rose or fell at the same rate, and during the postwar period the price changes in the various sectors of the economy moved to correct the distortions introduced by war. The South exported raw materials and imported processed goods. Because the prices of raw materials were high in 1865 and the prices of processed goods were relatively low, the South had extremely favorable terms of trade. As prices converged, the terms of trade steadily shifted against the South. Insofar as imports were necessary for the region's economic growth, this worked against the South's recovery.

In the last chapter of this study, I analyze the working conditions and wage rates of Negro farm laborers in North Carolina. The daily wage rates paid to Negro farm laborers in North Carolina in 1866 averaged 34 cents a day; roughly 60 per cent of the wage rates received by white farm laborers. As the physical output of farms expanded, the daily wage rates of Negroes rose; and by 1869 Negro farm wage rates were approximately 85 per cent of those received by white farm laborers. This higher level persisted through the 1890's.

The wage rates of unskilled white laborers were lower in the South than the North. Other things being equal, the South could successfully compete with the North in the production of goods requiring large numbers of unskilled laborers. However, skilled labor was relatively scarce, and in some sections, the wage rates of skilled laborers were higher than those received by comparable workers in the North. The South could not successfully compete with the North in the production of goods demanding skilled labor in the postwar period.

EUGENE LERNER

ECONOMIC GROWTH IN CANADA

My concern is with long cycles in Canadian economic development, and primary emphasis is on the growth and movement of population from 1850 to 1950. In an earlier study, I established that there have been long swings in urban building and real estate activity and in gross immigration between 1865 and 1950. Similar swings appear to exist in the rates of growth of total population and families, and in the number of marriages, births, deaths, emigration, net natural increase, net migration, increase in railway road mileage, and in the gross national product.

Two independent studies of population are being used. One was prepared by members of the economic research division of Central Mortgage and Housing Corporation under the direction of O. J. Firestone, who is also responsible for the historical estimates of gross national product. This study provides annual estimates of the component population flows and of net family formation and marriages from 1867 to 1952. The other study, by Nathan Keyfitz of the Dominion Bureau of Statistics, provides decade estimates of the population flows from 1851 to 1941. The railway road series is from the *Canada Year Book* and covers the period from 1841 to the present.

So far I have not attempted to date the troughs and peaks of the swings. I have used moving averages to establish their existence and frequency. Also, to compare long swings in population growth in Canada and the

United States, I have followed Kuznets' method of measuring and charting the first differences in population flow series and the second differences in stock series for decade totals or averages, overlapping five years.

The time patterns of the long swings in population growth have been almost the same in Canada and the United States since 1870. A rough comparison on the basis of changes in decade totals indicates this was also true from 1830 to 1870.

An interesting exception occurred between the 1870's and the 1890's. The contrast is most evident in changes in births and total population. The data imply that Canada missed the swing which reached its peak in the United States in the 1880's.

If one compares the changes in overlapping decade totals for the period beginning in 1870, the Canadian birth series declined over the first two quinquennial intervals as the United States series rose to a peak. It then rose through the next two intervals as the United States series declined to its trough. Thereafter the two series rose together to peaks in the interval 1900-1910 to 1905-1915. The difference in the sequence of changes in the total population increase in the two countries in this period is the same, except that the initial peak in the United States and the trough in Canada were reached one interval earlier than they were in the birth series.

A similar contrast in the experience of the two countries appeared again in the changes in deaths and natural increase. The Canadian death series reached a trough in the interval 1880-1890 to 1885-1895 as the United States series rose to a peak. The corresponding trough in changes in Canada's natural increase and the peak in the natural increase of the United States come one interval earlier.

The timing of the long swings in immigration and emigration was the same in the two countries in these years as in all other years from 1870 to 1950. But emigration exceeded immigration in Canada from the 1870's to the 1890's. Consequently, while the long swing in changes in net migration to the United States in this period appears distinctly as an increase, in the rate of net outmigration from Canada it appears very faintly as a decline. Two other series, changes in the flow of marriages and net family formation, do show positive peaks in the interval from 1875-1885 to 1880-1890, but they are so much less pronounced than later peaks in the same series that they would hardly qualify the movement in either series from 1875 to 1895 as a separate swing.

A comparison of urban building, railway transport cycles, and the movements of gross national product in Canada and the United States from 1870 to 1900 does not explain their different patterns of population growth. The only striking difference is in the transport cycle. When net annual additions to track mileage in Canada are plotted, whether as a five-year or a nine-year moving average, or as overlapping decade totals, the result is a single long cycle from the 1860's to the 1890's, reaching a pronounced peak in the 1880's.

These findings confirm the impression that the national unit is not the appropriate one for investigation of Canadian development. In the next stage of the study I shall examine the internal population movements within Canada and between Canada and the United States. At present I am:

1. Examining other historical economic series.

2. Determining the effect of the swings in immigration and emigration upon changes in total population increase and in the other population flows cited above. (In view of the relative importance of migrations in Canada's growth, the swings observed in births, for example, may be entirely the product of migrations and not partially attributable to changes in fertility of the native population.)

3. Looking for trends in the relative contributions of natural increase and net migration to population growth.

4. Calculating the relative amplitudes and trends in the amplitudes of the fluctuations in the population components.

5. Dating the swings in the series.

KENNETH A. H. BUCKLEY

THE GROWTH OF BRITISH GOVERNMENTAL EXPENDITURES SINCE 1890

Exploratory studies of the growth of governmental activity in several countries, initiated with the aid of a grant from the Ford Foundation, have resulted in the publication this year of *The Growth of Public Employment in Great Britain,* by Moses Abramovitz and Vera F. Eliasberg. A companion study on British governmental expenditures is nearing completion.

Its contents are:

Chapter

1 The British Economy and the Government Sector, 1890 and 1950
2 Government Expenditure and the National Product
3 The Structure of Government Purchases
4 Government Expenditure by Function
5 Government Expenditure, Central and Local
6 The Expenditure of the Nationalized Industries
7 The Future of Government Expenditure

Perhaps the most interesting results obtained lately relate to nationalized industries. Fixed gross domestic capital formation of public corporations has grown enormously in importance in Great Britain, as Table 15 shows.

This form of capital formation has now become a major component of gross investment by the public sector, and it is not surprising that the control of public enterprise investment has become a major political issue. As one of the avowed objectives of public ownership is the control given to the government over a vital investment sector, particularly in order to promote effective stabilization policy, I feel justified in discussing this subject at some length in the final chapter. This discussion is all the more important because the statistics do not indicate that public enterprises have pursued any coherent stabilization policy since World War II.

A word might be said about the gross fixed capital formation of public enterprise by sector. I only have figures for the postwar era, but, although these are rudimentary, they are interesting. In 1952 public enterprises purchased nearly 30 per cent of the total output of plant and machinery, and over 20 per cent of the total production of vehicles, ships and aircraft. This rough estimate of the composition of capital formation at least indicates the importance of public enterprise expenditure in strategic sectors of the economy.

A. T. PEACOCK

ECONOMIC GROWTH OF THE SOVIET UNION

The object of this study, begun in 1954 under a grant from the Rockefeller Foundation, is to set forth and analyze the evidence bearing on the question: How rapidly has the Soviet economy been growing? The study was undertaken in full recognition of the inherent difficulty of arriving at an answer to this question and of the special difficulties in securing reliable information.

TABLE 15

GROSS DOMESTIC FIXED CAPITAL FORMATION OF PUBLIC CORPORATIONS BY INDUSTRY CLASSIFICATION, GREAT BRITAIN, 1938-1953

(*millions of pounds sterling*)

Industry Classification	*1938*	*1948*	*1949*	*1950*	*1951*	*1952*	*1953*
Fuel and power	1.5	108	176	200	221	258	292
Iron and steel					46	49	49
Transport and communications	9	61	73	72	68	66	82
Housing and new town corporations		10	13	14	22	34	58
Other corporations		1	2	2	2	2	3
Total	10.5	180	264	288	359	409	484
Percentage of gross domestic capital formation	1.5	12.9	17.0	17.2	19.4	20.1	21.0

In addition to the work on the industrial and agricultural sectors, reported below, studies of a number of other sectors, including housing construction, transportation, labor force and population, and the standard of living, are in the final stages. Work in these areas is being done by Leo Grebler, Carolyn Shilling, Ernest W. Williams, Jr., Harold Wool, and Nancy Baster.

Industrial Production

During the year a preliminary statistical document was prepared containing some 240 Soviet output series, together with sources, descriptive notes and a bibliography. This document takes account of data in the recently published official Soviet statistical abstract, the first such abstract to appear in almost twenty years. A supplement is being prepared containing additional data and also series for Czarist Russia.

During July, I made a tour through a number of cities in western Russia, and a report of my impressions has also been circulated.

Work is now under way on a monograph on Soviet industrial growth. The plan is:

Chapter

1 Introductory Comments
2 The Data: Knowns and Unknowns
3 The Product Mix: Composition, Quality, and Variety
4 Growth Trends: A Structural Survey
5 Growth Trends: A Comparison with Industrial Developments in the United States
6 The Interwar Years: A Period of Transformation
7 The Postwar Years: Recovery and Growth
8 Some General Measures of Growth

Chapters 4 and 5 have been drafted. The core of the discussion in Chapter 5 was presented as a paper at the December 1956 meetings of the American Economic Association, which is to be reprinted as an Occasional Paper.

I hope that the remainder of the monograph can be drafted within the next few months.

Among those participating in the work on the industrial sector last year were Israel Borenstein, Adam Kaufman, and Marie-Christine Culbert.

G. WARREN NUTTER

Agricultural Production

Recent work in this sector of the study has concentrated on a thorough check of the basic output data heretofore collected, particularly the materials on livestock and livestock products. The appearance during the year of *National Economy of USSR,* the first Soviet statistical compilation since 1939, was helpful largely in rounding out the series on planted acreages and as a further check on livestock numbers for the 1950's. The policy of suppressing the publication of physical agricultural output magnitudes (virtually without exception after 1952) was not relaxed for the new official data compendium. Thus, the actual levels of output of crops (particularly of grains) and of livestock products in the 1950's remain shrouded in considerable uncertainty.

The manuscripts in preparation include:

1. A documented compilation of annual crop outputs, acreages and yields, livestock numbers and output of livestock products for 1913 or 1916, 1926-41, and 1945-55.

2. A documented compilation of prices received by producers for various crops and livestock products annually 1925 to 1956 by type of procurement or sale: for example, obligatory deliveries, state purchases, contractual deliveries, collective farm market sales.

3. An appraisal of the statistical estimating procedures used in USSR and an analysis of Soviet measures of aggregate agricultural output.

4. A set of aggregate output computations of our own employing (a) Soviet price weights (1926/1927 prices, 1935 "realized" prices reflecting procurement and free market prices, 1954-55 unit production costs based largely on state farm data) and (b) unit labor inputs (both Soviet and United States) unaffected by arbitrary pricing.

GEORGE KUZNETS

OTHER STUDIES

Two reports were published during 1956 and early 1957:

George J. Stigler, *Trends in Employment in the Service Industries*

Moses Abramovitz, *Resource and Output Trends in the United States since 1870,* Occasional Paper 52

One report is in press:

Clarence D. Long, *The Labor Force under Changing Income and Employment* (in press)

Penelope Hartland is revising her paper on "The Canadian Balance of Payments since 1868."

The subject of economic growth is dealt with in several of the reports in Section 1.

4. Organization of Economic Activity

THE MOBILITY OF CAPITAL IN MANUFACTURING INDUSTRIES

The rates at which resources flow into and out of various industries, and the factors influencing the rates, are the central problems of the study. My interest is primarily in the mobility of capital, in the light of the rates of return in various industries, and the effects of industrial structure, price movements, and related variables on the allocation of capital.

The first stage of the work, which is far from complete, is to compile data on capital in manufacturing industries at the finest level of detail the basic data source, *Statistics of Income,* allows. The period begins with 1938, when the industrial classification of corporate tax returns first became tolerably detailed. I hope eventually to extend the data to 1954, but at present I am treating 1938 to 1947 as a first period of analysis.

The main tasks in building up the basic data for our analysis may be summarized as follows:

1. The capital concept is fairly broadly defined compared with the concepts used in productivity analysis and national income accounting. Included are all assets of an industry except its investments in other (private) enterprises; that is, cash, accounts receivable, and so forth are included, as well as plant, land, and inventories. The definition of the return on capital will be similarly broad, excluding dividend receipts but including capital gains and inventory profits. When the focus of study is on the differential behavior of various industries, the effects on assets and incomes of differential price changes are not in any sense nominal or spurious and should not be eliminated from the capital measures. The inclusion of financial components of working capital seems essential to a correct estimate of capital as the command over resources devoted to the operation and growth of the business enterprise.

2. The industry classes change over time, and this source of fluctuation must be eliminated. The large changes in the classification in 1948 have led me to end the first period of analysis in 1947, but a chain will be provided with the later period.

3. The noncorporate sector of each industry is estimated. In 1939 and 1947 this part of each industry can be calculated from the census of manufactures. The incomplete material in individual and partnership tax returns indicates that a linear interpolation for other years would be improper, so a pattern of fluctuation of the noncorporate portion is estimated from these tax returns for the industries with much noncorporate enterprise.

The product of these, and many minor, adjustments is illustrated by the data for food and kindred products (Table 16). In addition to the data shown here, capital increments are being distributed among increments of short-term debt, long-term debt, and a portmanteau residual ("net worth").

Although the data should show the differential price movements that favor or disfavor individual industries, I would like to eliminate the fluctuations in the average level of asset prices that obscure year-to-year comparisons of assets. In general this adjustment requires shifting book values to current values by an appropriate industry price index, and then

shifting current values to constant (1947) prices by an index of prices of all manufacturing assets.

The data to carry through these adjustments are sadly incomplete. A constant price series of perhaps tolerable reliability has been constructed for the broader ("two-digit") industries. For the finer ("three-digit") classes one must make progressively more arbitrary assumptions and employ progressively rougher data, so I am compelled to leave them in book values, using the deflated two-digit series as a warning of the effects of general price level changes. The various series, including the rates of return, are being carried through for each industry so that I can now begin the analysis of the central problem of mobility of resources.

GEORGE J. STIGLER

DIVERSIFICATION AND INTEGRATION IN AMERICAN INDUSTRY

The study has five broad questions as its focus:

1. How diversified is the output of companies in various sectors of the American economy?

2. What characterizes industries in which there are many relatively "heterogeneous output" companies or in which a significant proportion of the industry's output arises from companies whose primary productive functions are in other industries? What proportion of total diversification occurs in the largest 100 and 1,000 companies?

3. Is there a relationship between the extent of diversification and integration, and company size?

TABLE 16

VALUE OF, AND RATE OF RETURN ON, TOTAL CORPORATE ASSETS IN FOOD AND KINDRED PRODUCT INDUSTRIES, BY BOOK VALUE AND BY 1947 PRICES, 1938-1947

Industry	*1938*	*1939*	*1940*	*1941*	*1942*	*1943*	*1944*	*1945*	*1946*	*1947*
				Value of Assets						
				(*millions of dollars*)						
Total, in 1947 prices	10,716	10,522	10,534	10,891	11,081	11,181	11,534	11,514	12,119	11,965
Total, book values	5,482	5,578	5,670	6,368	6,858	7,220	7,656	7,893	9,132	9,936
Bakery products	634	641	650	663	707	747	770	800	862	909
Confectionery	277	272	283	306	346	414	465	456	526	616
Canning	651	643	655	776	822	898	950	981	1,366	1,420
Meat products	979	991	1,040	1,218	1,306	1,349	1,399	1,368	1,596	1,822
Grain mill products excl. cereals	489	529	501	592	665	747	774	829	1,006	1,192
Cereal preparations	111	115	118	110	139	109	200	165	180	149
Dairy products	590	588	596	689	842	896	1,017	1,107	1,229	1,213
Sugar	664	717	712	783	775	726	686	748	751	949
Miscellaneous foods	910	928	944	1,059	1,086	1,157	1,204	1,207	1,438	1,581
				Rate of Return						
				(*per cent*)						
Total, in 1947 prices	3.65	6.03	5.78	6.87	7.23	6.89	6.31	6.08	10.50	8.89
Total, book values	3.82	6.33	5.93	6.90	7.62	7.54	6.90	6.57	11.68	9.42
Bakery products	7.19	6.68	5.70	5.32	7.41	8.08	7.65	7.77	14.37	10.36
Confectionery	8.67	10.08	9.41	9.43	11.30	10.90	10.00	9.84	16.05	16.55
Canning	.43	7.44	7.84	10.56	8.98	7.43	7.34	7.23	12.36	7.19
Meat products	.42	4.41	4.80	4.11	5.63	5.57	5.54	3.03	10.86	7.15
Grain mill products excl. cereals	3.97	5.42	4.89	6.50	6.66	8.63	5.98	7.99	14.36	11.50
Cereal preparations	6.30	9.04	8.87	10.29	11.09	12.43	6.46	10.01	12.25	12.10
Dairy products	4.94	6.29	5.40	6.45	8.29	8.22	6.88	6.92	10.51	8.26
Sugar	.15	3.40	3.21	5.57	5.02	4.26	4.32	3.91	5.22	6.17
Miscellaneous foods	7.90	8.54	7.44	8.60	9.26	8.80	8.39	7.91	11.17	11.34

Figures may not add to totals because of rounding.

4. What have been the trends in diversification and integration and the directions in which companies have diversified?

5. What are the causes and effects of varying patterns of diversification and integration?

The main bodies of data which I plan to use consist of Census Bureau enterprise-establishment statistics, the Federal Trade Commission study of the thousand largest manufacturing companies in 1950, and data developed at the National Bureau for 111 companies (all among the 200 largest manufacturing companies).

During the past year, I completed a record of changes in the product structure of the 111 companies between the years 1929, 1939, 1950, and 1954. The record was developed from various public sources of information. A comparison of the product record developed for 1954 with census data for the same companies indicated that, when coded to the four-digit Standard Industrial Classification level, it met the required standards of completeness. A further comparison of the data for 1950 with data prepared for this purpose by the Federal Trade Commission also corroborated the accuracy of the product record for that year.

The record developed for the 111 companies from public sources consists of lists of products at several points in time, and of changes in the lists. In addition, I am preparing complementary data of a quantitative nature for the same companies from the 1947 and 1954 censuses.

The latter information, which will be used subject to the non-disclosure rules of the Census Bureau, will show the size of the total output of companies in industries which they have entered at various times after 1929 compared with the total output of the companies in 1947 and 1954. These data have also permitted me to rank companies on the basis of the degree of integration and diversification in their product structures. Thus it should permit an examination of the relationships between diversification and integration, on the one hand, and such variables as the rate of company growth and the degree of stability in earnings, on the other.

Table 17 shows simple counts of products added and deleted during the periods 1930-1939, 1940-1950, and 1951-1954, in the companies from among the 111 that fall

TABLE 17

NUMBER OF ADDED AND DELETED PRODUCTS FOR SELECTED COMPANIES IN FOUR INDUSTRIES, 1930-1954

INDUSTRY	*Total*	*Primarily for Integration*	*Primarily for Diversification*
		Products Added	
Food			
1930-1939	54	11	43
1940-1950	28	7	21
1951-1954	17	1	16
Tobacco			
1930-1939	3	2	1
1940-1950	0	0	0
1951-1954	1	1	0
Textile mill products			
1930-1939	13	0	13
1940-1950	8	0	8
1951-1954	2	0	2
Rubber			
1930-1939	41	4	37
1940-1950	36	3	33
1951-1954	34	2	32
		Products Deleted	
Food			
1930-1939	6	0	6
1940-1950	14	2	12
1951-1954	9	0	9
Tobacco			
1930-1939	1	1	0
1940-1950	1	0	1
1951-1954	0	0	0
Textile mill products			
1930-1939	0	0	0
1940-1950	0	0	0
1951-1954	6	0	6
Rubber			
1930-1939	3	0	3
1940-1950	4	0	4
1951-1954	4	0	4
		Products Produced, 1954	
Food	154	21	133
Tobacco	22	4	18
Textile mill products	48	3	45
Rubber	134	14	120

The sample includes twelve companies in the food industry and five companies in each of the other groups.

into four two-digit industries. It also shows the total number of products for these companies in 1954. All products have been coded to the four-digit level and divided into products that can be characterized as contributing primarily to diversification or, on the other hand, to integration.

Two salient facts appear. First, some industries in the American economy have shown a remarkable mobility in the product composition of their large companies. Second, there are striking differences in the extent of this mobility between the various industrial sectors. Thus, over 100 products or services were added by the sample of rubber companies between 1929 and 1954 compared with a total of 134 products or services which the companies produced in 1954.

In contrast, over the same period, only four products were added in the sample of tobacco companies, and they had a total of only 22 products or services in 1954.

The striking mobility in product composition in some sectors of the economy revealed in the table is a conservative estimate in view of the coding of products to the four-digit SIC level. A much greater shift would have been revealed if a more detailed industry classification were shown.

Another tentative conclusion from my study is that a strong positive relationship exists between size of company and degree of diversification within the sample of large companies.

I am now exploring the characteristics of the industries into which the companies have diversified in terms of their rate of growth, the average size of plant in the industry, and the cyclical variability of their sales. For these purposes, I have prepared measures of rate of growth for most of the four-digit SIC industries in the 1940-1954 period, and for as many as comparability of data permit in the 1930-1939 period. In addition, I have computed measures of average plant size for the above industries and am developing data on cyclical variability for all of the production series in the Federal Reserve Board index of production.

MICHAEL GORT

THE MERGER MOVEMENT IN AMERICAN INDUSTRY

In August 1954 research was begun to construct a detailed time series of merger activity in manufacturing and mining from 1895 through 1920. A manuscript describing and analyzing the series has been read by a staff committee, revised, and is now being edited for distribution to the Board of Directors.

The series represents a comprehensive compilation of data on our first and largest merger movement, an extraordinary burst of activity centering around 1898 to 1902. The movement has already been examined, but earlier studies lack the scope necessary for various tests of the causes of the first merger wave. The new data permit a variety of such tests, and the proposed monograph offers several examples of this use of the data.

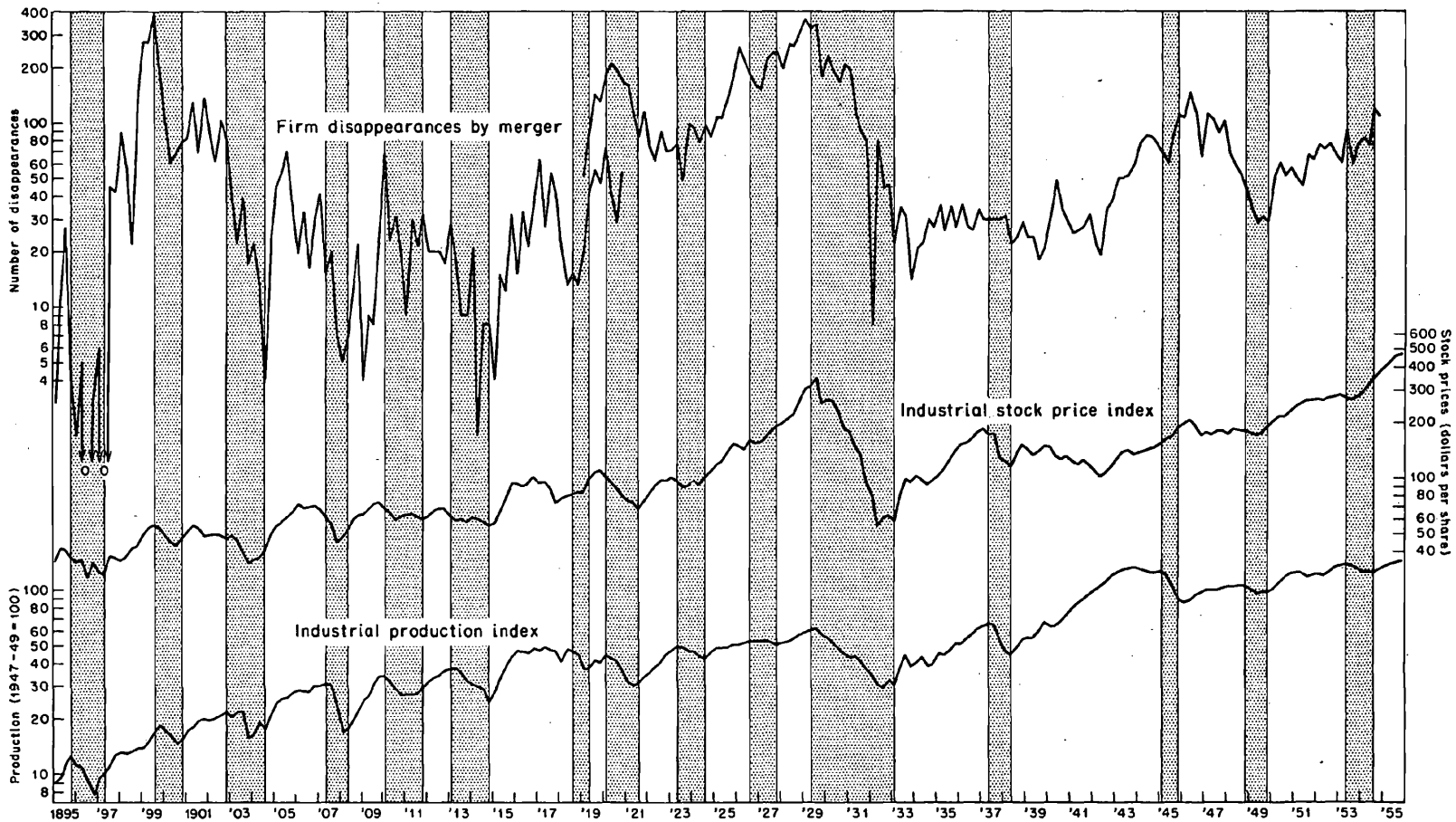
The study also contains series for 1904 through 1918, a chapter of merger history for which data had never been compiled. Now we have comprehensive (though not fully comparable) merger series dating from the 1880's through 1955. The series span probably all of the period in which mergers have played a significant role in the growth of industrial enterprises. The quarterly time series for 1895 through 1955 is presented in Chart 3.

An example will illustrate the uses to which the merger data can be put. A popular explanation for the first merger wave has been that the retardation of industrial growth in the preceding period accentuated competition, and that the mergers were devices to reduce the severity of this competition. This explanation can now be tested. The breakdown of merger activity by industry makes possible the identification of the industries of highest relative merger activity in the turn-of-century merger wave. By using the growth rate data of industries presented in Arthur F. Burns' *Production Trends in The United States Since 1870,* one can determine whether the high-merger industries were those experiencing increasing or decreasing rates of growth.

As Table 18 indicates, the leading industries in the 1895-1904 merger boom were usually those undergoing acceleration in growth im-

CHART 3

Quarterly Series of Firm Disappearances by Merger, Industrial Stock Price Index, and Industrial Production Index, 1895-1955



The shaded periods are contractions in business activity. The firm disappearances by merger and the industrial production index are adjusted for seasonal variations. Stock price index is from Dow Jones Co. Inc.; industrial production index, from Standard Statistics Co. (1895-1918) and Board of Governors of the Federal Reserve System (1919-1955).

Ratio scale

TABLE 18

ANNUAL GROWTH RATES OF PRODUCTION SERIES APPROPRIATE TO THE EIGHT INDUSTRIES OF HIGHEST 1895-1904 MERGER ACTIVITY, BY DECADE, 1870-1915

DECADE	TOTAL NUMBER OF SERIES COVERED	PERCENTAGE OF SERIES BY AVERAGE ANNUAL GROWTH RATE OF OUTPUT			
		10% or More	*5.0-9.9%*	*0-4.9%*	*Less Than 0%*
1870-1880	23	26.1	43.5	21.7	8.7
1875-1885	24	37.5	45.9	8.3	8.3
1880-1890	38	18.4	44.7	34.2	2.7
1885-1895	44	9.1	43.1	45.5	2.3
1890-1900	44	11.4	43.1	41.0	4.5
1895-1905	44	31.8	47.7	18.2	2.3
1900-1910	44	11.3	41.0	41.0	6.7
1905-1915	44	6.8	25.0	59.1	9.1

mediately before the merger wave. The sequence of rapid growth and increased merger activity was also noted in the revival of merger activity from 1915 to 1920. Then the leading merger industries were petroleum, chemicals and motor vehicles, all of which exhibited high and increasing rates of growth in the years immediately preceding this period.

Other tests indicate that, while merger activity tends to respond positively to industrial expansion, this response is not very sensitive. Its short run response to capital market conditions, however, is clearly sensitive. Our findings indicate that we shall most probably find a revival of merger activity associated with the period, usually midway or late in a protracted industrial expansion, when stock prices are high and rising and the capital market is buoyant (see Chart 3).

RALPH L. NELSON

STRUCTURE OF WORLD TRADE AND PAYMENTS

Several preliminary reports on this study, which is being undertaken with the assistance of a grant from the Ford Foundation, have been published or are ready for publication:

Herbert B. Woolley, "On the Elaboration of a System of International Transaction Accounts," *Problems in the International Comparison of Economic Accounts,* Studies in Income and Wealth, Volume Twenty

Herbert B. Woolley, "Observations on the Structure of World Trade and Payments." *Hearings before Subcommittee on Foreign Economic Policy of the Joint Committee on the Economic Report,* 84th Cong., 1st sess., November 10, 1955, reprinted in revised and extended form in *World Politics,* July 1956

Herbert B. Woolley, "The World Trade and Payments Pattern," *Hearings before Subcommittee on Customs, Tariffs, and Reciprocal Trade Agreements of the House Committee on Ways and Means,* 84th Cong., 2d sess., September 24, 1956

Herbert B. Woolley, "Transactions between World Areas in 1951," and Herman F. Karreman, "World Transportation Account, 1950-1953," papers presented at the special conference on international economics, April 1956

Cornelius Dwyer, "The Oil Trade in the International Balance of Payments in 1951," and Robert M. Lichtenberg, "The Role of Middleman Transactions in World Trade," proposed Occasional Paper; abstracts published in *Proceedings of the Business and Economic Statistics Section,* American Statistical Association, 1955-1956

Carmellah Moneta, "The Estimation of Transportation Cost in International Trade Accounts," January 1957. Submitted to *Review of Economics and Statistics* for possible publication.

Herman F. Karreman embodied the results of this study of transportation transactions in the paper he presented to the Universities–National Bureau conference on international economics in April 1956, which he has since revised and extended.

Karreman cast up two-valued matrixes

showing freight and other transport transactions between world areas as reported or estimated on both sides for the years 1950-1953. He introduced estimates for freight paid on imports valued c.i.f. by a large number of countries, assigning the payments to the partner countries by using information on the flag distribution of vessels calling or discharging cargo at ports of the importing country. He constructed accounts for the transactions of the refugee fleets flying the flags of Panama, Honduras, and Liberia, of the United Kingdom tanker fleet, and of the Greek fleet, and provided estimates for bunker sales and port receipts where there was an indication that these had been omitted.

Also Karreman tested his freight rate data by making a fresh calculation of the freight bill on British and French imports by source for the years 1950-1953. The calculation permitted him to assess the performance of the United Kingdom and French fleets compared with the United States and Norwegian fleets and illustrated the method of improving the record of transportation transactions which we had hoped could be applied to all countries.

Cornelius Dwyer completed preparation of the detailed record of quantity, f.o.b. value, freight, and c.i.f. value of crude petroleum and petroleum products moving between countries in 1951 and employed the results in estimating the similar movements in 1952, 1953, and 1954. Thus, he now has a basic statistical record of trade between countries on which to erect an analysis of petroleum transactions between world areas in those years, and he is preparing such an analysis.

In a revision of his paper on the role of middleman countries in world trade, Robert Lichtenberg has incorporated an analysis of the two-valued matrix of trade in cotton between countries, so that his commodity analysis now includes cotton as well as rubber, coffee, and petroleum (the last based on Dwyer's work).

These world-wide analyses of records of trade between countries in particular commodities yield totals of exports sent and imports received by all countries which agree remarkably well. But they reveal patterns of divergence between records of buying and supplying countries which can largely be explained by the differences in reporting systems and in the channeling of trade through middlemen. In these cases one observes the character of the general and intercountry agreement or disagreement in quantities and values which anyone undertaking to employ trade records in economic analysis must take into account.

Our compilation of merchandise trade in country-commodity detail was curtailed, because of its costliness, rather far short of our objectives. Lichtenberg completed, reviewed, and corrected the compilation of the detailed record of 1951 exports with a partial matching of entries reported on the import side, and prepared a textual explanation and country notes on sources, method, coverage, qualifications, and limitations. The record for 1951 can now be understood and used by others. He spent some time studying the two-valued record of trade for which we have reports from both sides covering most of world trade in about twenty commodities, and is writing a paper on divergences in the reporting of trade between countries in commodities.

Progress in the study of payments accounts was reported in a paper on transactions between world areas in 1951 which I presented to the Universities–National Bureau conference on international economics in April 1956. I incorporated some of the findings in an article on the world trade and payments pattern in the July issue of *World Politics*. In September I presented a paper to the Subcommittee on Tariffs, Customs and Trade Agreements of the House Ways and Means Committee on the subject of world trade and payments patterns. In this I drew heavily on the *World Politics* article and earlier papers, focusing the material on the tariff issue.

Walther Michael completed the phase of work requiring continuous use of country files at the International Monetary Fund. Since then we have sought to work the results of Karreman's and Dwyer's study and some further calculations by Carmellah Moneta on bunker sales and freight adjustments into our

set of country accounts covering the period 1950-1954. We are analyzing the set of country accounts and auditing interarea matrixes for the five years for consistency, for the light they shed on unreported transactions (for example, those of British colonies), and for the characteristics of the world economy.

The analysis of our set of country payments accounts is being shaped into a monograph on the structure of world trade and payments which will be the principal publication of the project. It should be in draft toward the end of 1957. Dwyer's analysis of petroleum transactions should also appear in draft about that time. If time permits, Lichtenberg and I will prepare a Technical Paper on the record of merchandise trade between countries in particular commodities presenting and analyzing the data we have compiled for 1951.

Finally, mention should be made of a special study of international capital movements between world areas in 1950-1954. Walther Michael is using the detailed information we have compiled on capital transactions from country balance of payments accounts, preparing, auditing, and in so far as possible reconciling the two-valued matrixes which can be prepared for capital movements of different types. He plans to analyze the record of capital flows in relation to economic growth, studying such matters as the relationships between public and private capital, the relative importance of direct and portfolio investment, and of loans and credits, and the relationship between the flow of capital and the flow of investment income.

HERBERT B. WOOLLEY

STATE AND LOCAL GOVERNMENT EXPENDITURES

I have written a draft of a report on city expenditures in relation to size and other characteristics of cities, which I am revising in the light of comments by several readers.

In the latter part of the year I expect to begin a study of patterns of growth in state and local expenditures, in terms of amounts in current dollars and in dollars of constant purchasing power, of the total and per capita amounts, and of the proportions of gross national product they represent. The analysis is to be carried out for combined state and local expenditures, the totals and the major functional categories, as well as for the two levels of government viewed separately, utilizing the data recently made available by the Bureau of the Census.

Comparable data are now at hand for the years 1902, 1913, 1922, and 1927; biennially from 1932 to 1952; and for each year since 1952. Total expenditures are reported separately for state and for local governments, and for both levels direct expenditures are broken down by function and by character and object. In addition, state payments to local units are reported for each year, in total and classified by major purpose.

HARVEY E. BRAZER

OTHER STUDIES

Two reports were published early in 1957:

Gideon Rosenbluth, *Concentration in Canadian Manufacturing Industries*

Regional Income, Studies in Income and Wealth, Volume Twenty-one

The Demand and Supply of Scientific Personnel, by David M. Blank and George J. Stigler, is in press. "Distribution of Union Membership in the United States, by State, 1939 and 1953," by Leo Troy, is being revised for publication as an Occasional Paper, and "A Report on Research in Income Size Distribution in the United States," by George Garvy, is being reviewed by the staff. The conference report, "An Appraisal of the 1950 Census Income Data," Studies in Income and Wealth, Volume Twenty-three, is being edited.

Studies of the organization of the capital markets in the postwar period and of the economic aspects of pensions are reported in Section 1. A study of regional and industrial fluctuations is reported in Section 2.